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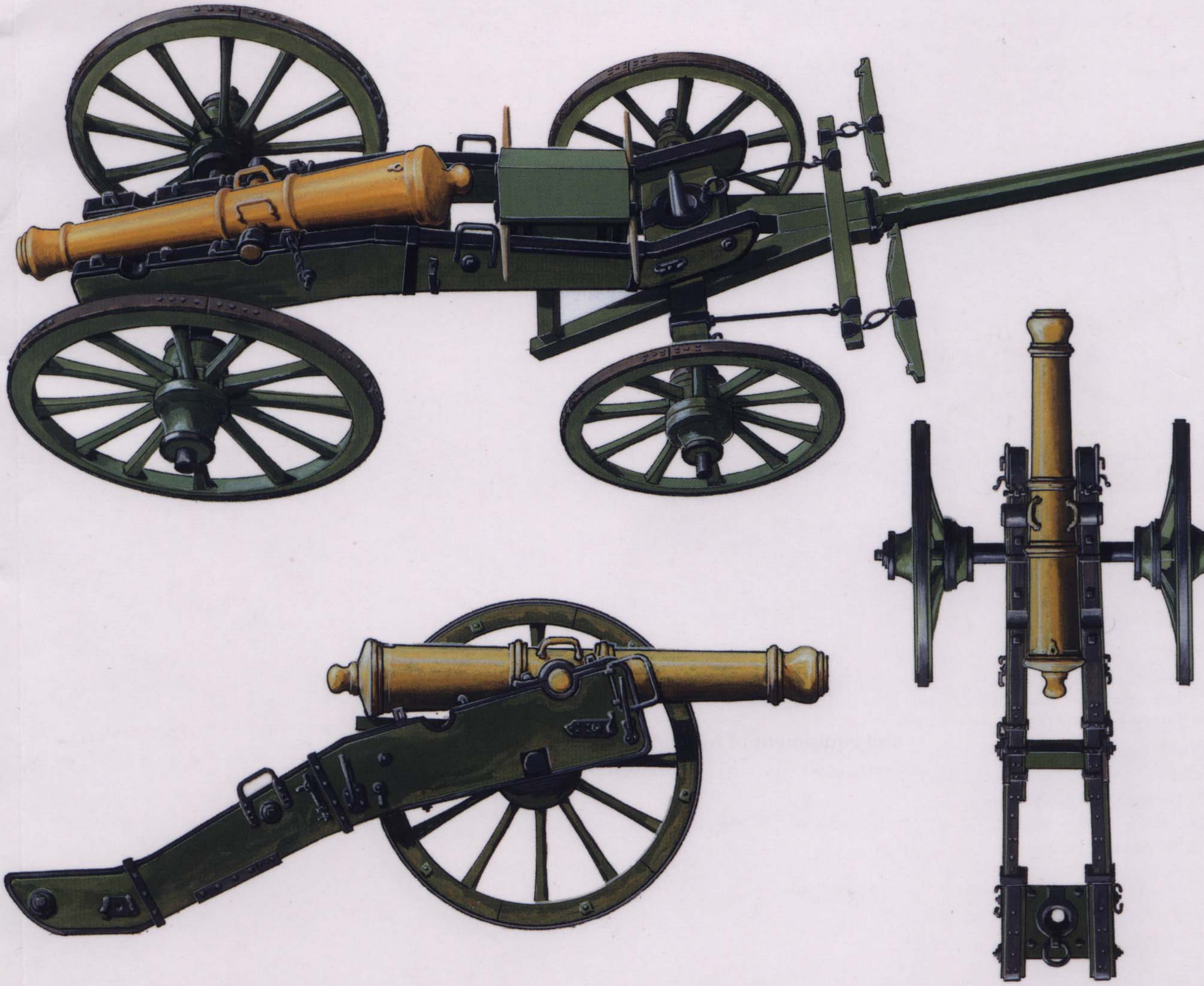
Napoleon's Guns 1792–1815 (1)

Field Artillery



René Chartrand • Illustrated by Ray Hutchins

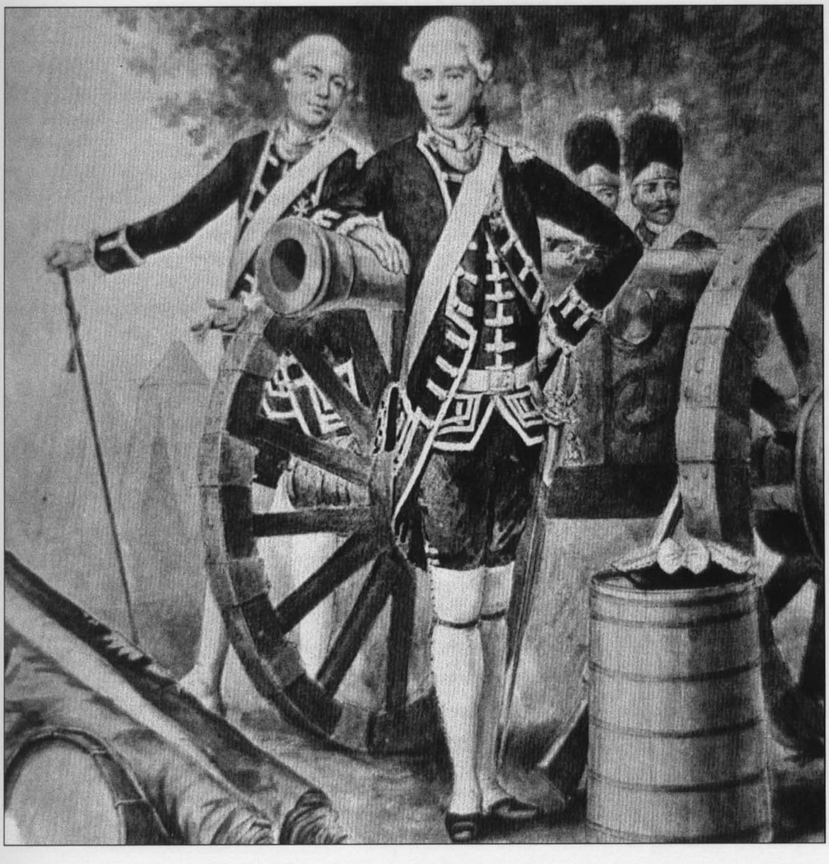
NAPOLEON'S GUNS 1792–1815 (1) FIELD ARTILLERY

FRENCH ARTILLERY IN THE 18TH CENTURY

In 1785, the young Napoleon Bonaparte graduated from the Military School in Paris to become a second lieutenant in the La Fère Regiment of the *Corps royal de l'artillerie*; his supreme commander was the elderly General de Gribeauval. After a long series of political battles, France had adopted the innovative system of artillery drawn up and introduced by Gribeauval. The young Napoleon was therefore fortunate to become an officer within a few years of the adoption by the French Army of what was arguably the best artillery system in Europe at that time.[1]

As remarkable as Gribeauval's new system was, it had been the object of a long and bitter political fight. The previous system, adopted in 1732, had been that of Lieutenant-General Jean Florent de Vallière, the Inspector of the Artillery.

In its day, the Vallière system had been a great improvement over the lumbering artillery trains seen in the age of Louis XIV and Marlborough. Up to the 1730s, ordnance used by the French armies in the field consisted of myriad models, made either in France or abroad featuring different calibres. Ammunition for such an artillery park was a permanent nightmare for supply officials. Transportation was another daunting challenge since they were, as a rule, very heavy. Thus a 12-pdr would require nine horses to pull it and there were times when bullocks had



Officers of the Royal Lorraine Regiment standing next to one of the regimental 4-pdr guns assigned to infantry battalions in 1757. (*La Sabretache*, 1894)

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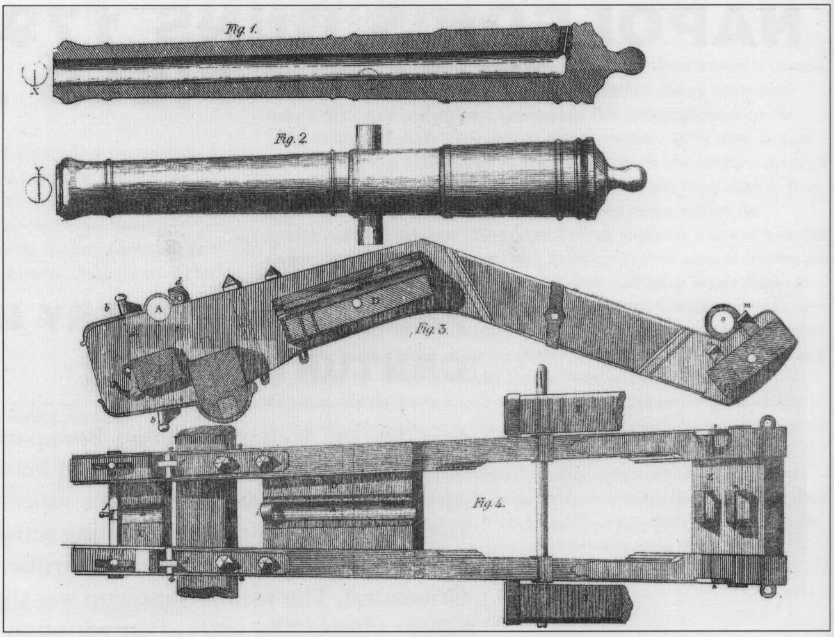
[1] For further details of the career of the young Napoleon Bonaparte see 'Artillery Officer Bonaparte 1785–93' by the same author in *Osprey Military Journal* issue 2.5, pp.33–41.



Rostaing light 1-pdr gun with its carriage as illustrated by de Scheel. The Count de Rostaing, an artillery officer with the French East India Company serving in the tropics at Ile-de-France (now Mauritius) and in India, designed a lightweight small-calibre brass gun that could be carried by mules and proved useful in campaigns in central India during the late 1740s. The Rostaing gun was said to be a 4-pdr but it actually only fired a 1lb ball. Its ingenious carriage was also light and made the gun very simple to serve. Although retained in Gribeauval's system, its use was limited.

to be used. These were therefore very slow-moving trains. The gunners had been militarised by Louis XIV in the early 1670s, but the drivers were civilian contractors who were none too keen to get the guns and associated supply wagons near the enemy. If shooting started a little too close for their comfort, they were liable to flee. However, this was the state of affairs across the whole of Europe.

Vallière's system, as proclaimed by royal order on 7 October 1732, replaced all previous systems used by the French Army. Its major intention was to reduce the number of calibres and introduce standard models of gun barrels and mortars, all of which would be manufactured in France. In this, Vallière was totally successful and the new artillery system of the French Army consisted of 4-, 8-, 12-, 16- and 24-pdr guns, as well as 8- and 12-inch mortars. Although there was no clear division, the 4-, 8- and 12-pdrs were considered the field pieces and those of heavier calibres were thought more suitable for sieges. They would all be manoeuvred the same way. The rate of fire of 4-pdrs was rapid, about ten rounds per minute, those of heavier calibre would fire one or perhaps two rounds a minute.

In the first decade after its introduction, the Vallière system was certainly sufficient but as time passed and the nature of warfare changed, its shortcomings were increasingly glaring. During the War of the Austrian Succession (1744–48) an urgent need for light field pieces that could manoeuvre with battalions in the field was identified. Various light pieces had been added, mostly at the behest of Marshal de Saxe, France's finest army commander of the period, but these were somewhat ad hoc additions. During the Seven Years War (1756–63) the call for light guns was renewed and, on 20 January 1757, two Swedish-style 4-pdrs were issued to each infantry battalion, joined by Rostaing guns from 1759.[2] However, these reforms could not be carried out immediately and they did not address the fundamental problems of an ageing artillery system. Furthermore, the performance of some of the different mortar types during sieges was questionable.

A further omission in Vallière's system was the lack of howitzers, although commonly used by the Dutch and the British from the late 17th century. There was considerable interest in this novel piece of artillery since it was relatively lightweight and could fire a small exploding shell, case shot or ordinary shot. This lack was keenly felt

RIGHT **Profile of J.-B. de Gribeauval, the inventor of the system that bore his name introduced from 1765 in France.**

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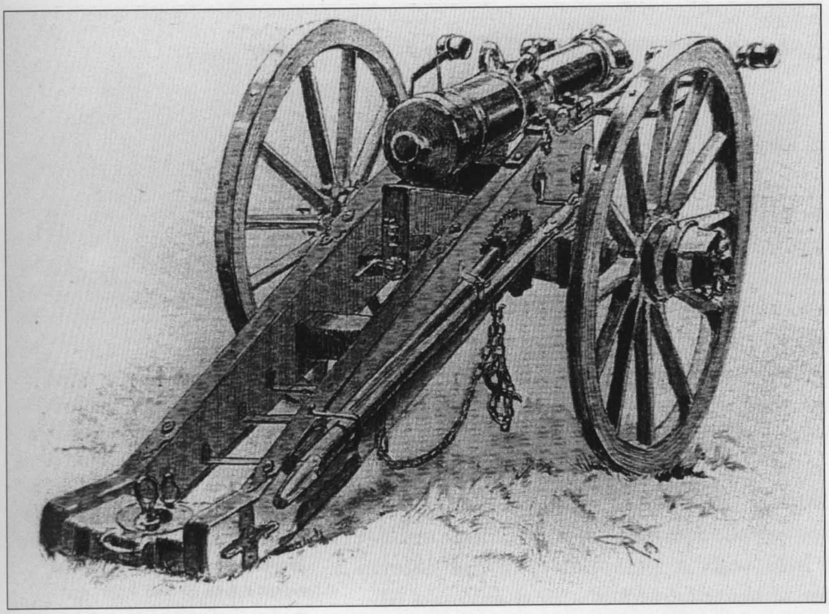
[2] The Swedish army had found light guns useful for infantry support in its Nordic campaigns; in winter, some would be mounted on sleigh-style carriages.



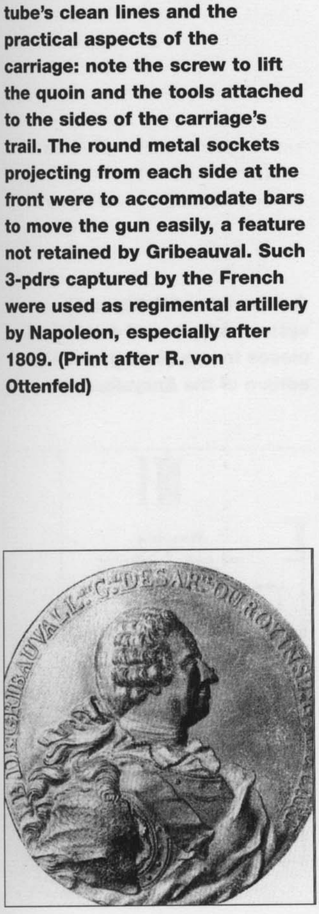
An Austrian 3-pdr brass field gun on its carriage, 1750s to early 1800s. As can be seen, Gribeauval was inspired by the tube's clean lines and the practical aspects of the carriage: note the screw to lift the quoin and the tools attached to the sides of the carriage's trail. The round metal sockets projecting from each side at the front were to accommodate bars to move the gun easily, a feature not retained by Gribeauval. Such 3-pdrs captured by the French were used as regimental artillery by Napoleon, especially after 1809. (Print after R. von Ottenfeld)

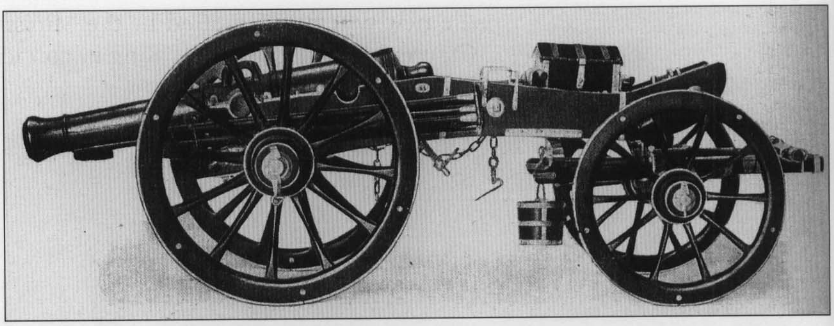
during the War of the Austrian Succession and serving officers pushed for their introduction. However, Vallière's son, Joseph Florent de Vallière (1717–76), became commander of artillery schools and battalions in 1747. He was a conservative character and staunchly supportive of the system introduced by his father. Under pressure, he developed a heavy 8-inch howitzer, first cast at Douai in 1749, but few were produced. He proposed no other major improvements but proved a skilful courtier. Thus, the French Army fought the Seven Years War with increasingly outdated artillery equipment.

GRIBEAUVAL

This was the situation when Jean-Baptiste Vaquette de Gribeauval proposed his reforms. He was born at Amiens on 4 December 1715 in a bourgeois family active in both civic and military affairs. Young Jean-Baptiste was found to be especially gifted in sciences and mathematics and his parents encouraged him to go into the artillery. In 1757 Gribeauval was sent to Vienna as a liaison artillery officer with France's new ally, Empress Maria Theresa's Imperial Austrian Army. He arrived in Austria at a time when its artillery was acknowledged as the most progressive in Europe. This was the work of the remarkable Austrian Director-General of Artillery Prince Joseph Wenzel Liechtenstein, appointed in 1744, a post he held until 1772. Following the War of the Austrian Succession (1744–48), in which the Austrian artillery had not performed well, Liechtenstein quickly started modernising the Imperial artillery, both its equipment and personnel, investing some of his own capital in the process. The new guns in the Liechtenstein system were clearly divided into field and siege artillery, were lighter in weight and had cleaner lines. The carriages had a screw-operated quoin, rammers and handspikes attached to the side of the trail, and other improvements that made them easier to manoeuvre.

All this was not lost on the observing Gribeauval. He was already convinced of the need for reform, and as early as 1748 had developed designs for a traversing carriage suitable for fortress and coastal artillery – an invention that would revolutionise ordnance in fortifications. During the Seven Years War, Gribeauval saw plenty of action, first as liaison officer then, from 1759, as an *Oberstleutnant* in the Austrian Army. By 1762, he had been raised to the rank of *General-Feldwachtmeister* and, in September and October, greatly distinguished himself as the commander



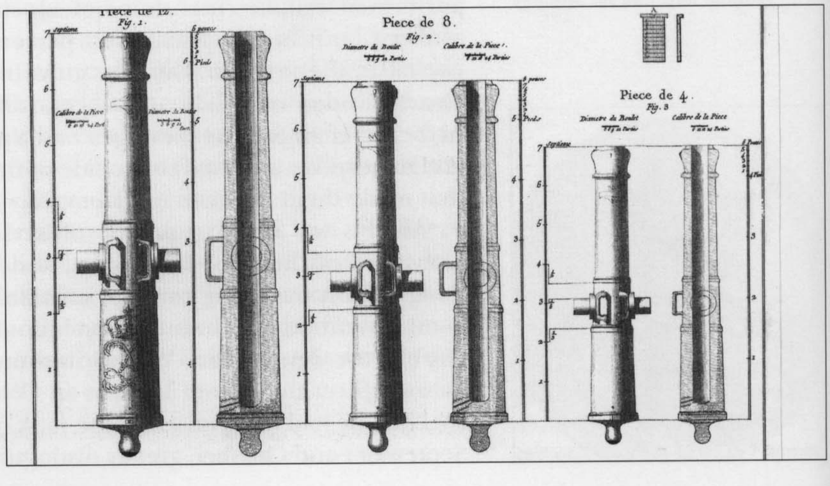


Model of a Gribeauval 12-pdr brass field gun with its limber. Gribeauval guns of this calibre were in service from 1765 to 1829 in the French artillery. In this model, the barrel is placed in the firing rather than the correct travelling slots. The metal parts of the carriage shown as bright were painted black on the actual carriages.

of the artillery and engineers defending the fortress of Schweidnitz in Silesia against the Prussians. When the garrison commander, the Count of Guasco, surrendered on 9 October, the town was out of ammunition but the Prussians had suffered over 7,000 casualties compared to less than 1,000 for the Austrians. Schweidnitz's defence, particularly the management of its artillery, became famous and was cited as an example of siege defence by military tacticians well into the 19th century. During Gribeauval's detention in Prussia, Frederick II tried to lure him into his army without success. Back in Austria, Empress Maria Theresa promoted Gribeauval to *Feldmarschall-Leutnant* (lieutenant-general), and decorated and honoured him with a personal letter of thanks accompanied by a fine miniature of herself framed with diamonds. She hoped he would remain in her army but, following the end of the war, Gribeauval returned to Paris.

His fame had spread to the highest circles in France and, having left a lieutenant-colonel in 1757, when he returned in 1763 he was promoted to Maréchal de camp, decorated as a commander of the Order of St. Louis and granted the post of Inspector-General of the French artillery. Gribeauval was now second in charge of the French artillery, and was clearly brought in by the Duke of Choiseul, a powerful minister at court, with the mandate to modernise France's artillery. The current Director-General of Artillery and Senior Gunner, Joseph Florent de Vallière, had been asked by King Carlos III to come to Spain in 1761 to review his army's artillery, arsenals and fortifications, Choiseul let him go.

With Vallière out of the way, Gribeauval could proceed with the system he had been working on. In order to settle any disputes over the effectiveness of the artillery currently used in the French Army, the king ordered Gribeauval to proceed to Strasbourg. There, under the authority of Marshal Contades, the commander-in-chief in Alsace, Gribeauval conducted trials on guns made according to his new designs under the close professional scrutiny of several expert officers. Assisted by such progressive officers as Maritz, Gomer and Rostaing, further refinements were added and the results of the trials were firmly in favour of Gribeauval's system. On the basis of Gribeauval's report and the minutes of the Strasbourg trials, a royal order for the introduction of



Gun barrels of Gribeauval's system: 12-, 8- and 4-pdr field pieces from a plate in the 1784 edition of the *Encyclopédie*.

the new system was drafted by the Ministry of War in 1765, approved by Choiseul, and finally by the King in council on 13 August.

THE GRIBEAUVAL SYSTEM

The Gribeauval system was now the official system for the French artillery. In order that this would remain confidential the royal order was not printed. Copies were only made for the inspector-generals and the commanders of the artillery schools. They were not allowed to make copies or display it, simply to put it into practice as and when the new *matériel* arrived. This was almost certainly done to keep the system safe from the prying eyes of foreign powers. They would see the new guns and carriages appearing, but hopefully not realise the vast scope of the reforms. Another reason was that many, possibly the majority, of French artillery officers were not as progressive as their commanders and a gradual introduction made in a secretive way was thought to abate opposition.[3]

The royal order introducing the Gribeauval system went into effect from 15 October 1765. It covered guns and howitzers; mortars were omitted at this point although they were finally introduced 20 years later. The most important changes concerned the field artillery to be used on campaign. One of the faults of the Vallière system was that there was no separation between the heavy artillery usually used either for sieges or in fortresses, and the lighter pieces that were used on campaigns in the large-scale linear battles of the 18th century. Gribeauval's system, at its fullest extent, was to consist of:

FIELD ARTILLERY	SIEGE AND GARRISON ARTILLERY
12-, 8- and 4-pdr guns	24-, 16-, long 12-, long 8-, and long 4-pdr guns
1-pdr guns for light troops	8-inch howitzers.
6-inch howitzers	12-, 10- and 8-inch mortars (cylindrical chamber) 12-, 10- and 8-inch Gomer mortars (conical chamber) 15-inch stone mortars

This was the ideal system in its entirety. The siege and garrison artillery will be covered in the second volume of this series. The actual implementation of the new system was gradual and subject to a number of changes.

FIELD ORDNANCE

The field artillery had the most urgent need to be transformed into a modern organisation and priority was therefore given to it. Gribeauval's system considerably augmented the amount of field artillery given to an army. The following figures regarding artillery numbers for an army of 100 battalions in the field demonstrate the differences. Using the Vallière system, an army of 100 battalions had the following artillery complement:

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[3] The first public appearance of prints showing some of the 'artillerie nouvelle' (new artillery) seems to have been in the 1777 Copenhagen edition of De Scheel's *Mémoire d'Artillerie* and the 1784 edition of Diderot and D'Alembert's *Encyclopédie*.

GUNS	CALIBRE	HORSES	WAGONS
20	12-pdr	420	60
40	8-pdr	600	80
70	4-pdr	560	70
20	1-pdr	140	20

A total of 150 guns, 1,720 horses and 230 wagons.

According to Gribeauval's system, an army of 100 battalions would now have the following field pieces:

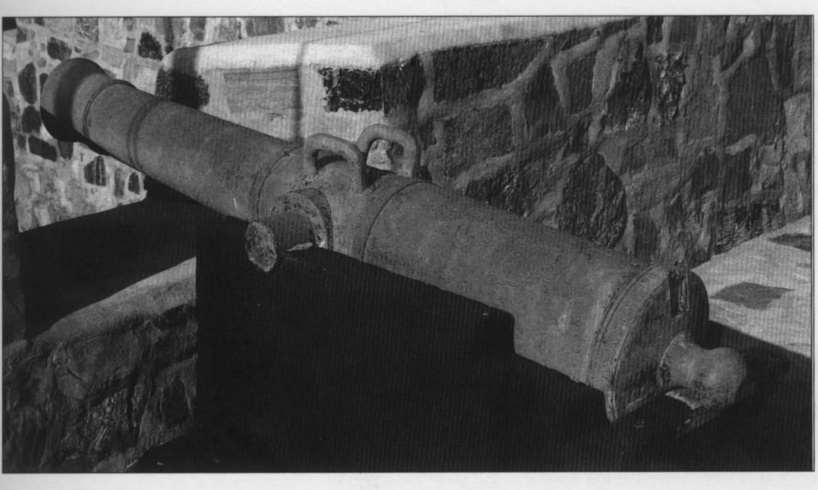
GUNS	CALIBRE	HORSES	WAGONS
80	12-pdr	7x80=1,520	3x80=240
80	8-pdr	5x80=1,040	2x80=160
40	4-pdr	3x40=280	1x40=40

A total of 200 guns, 2,840 horses and 440 wagons.

The advantage was obvious. There was a great increase in heavier calibre field guns, which, thanks to their reduced weight and better-designed carriages and limbers, were actually lighter and could keep up with the field army much more easily. For 100 battalions, the number of 8- and 12-pdrs went from 60 to an amazing 160, a revolutionary increase in firepower. True, there were now more horses and wagons (now named caissons), but the total weight of the guns, carriages and caissons was lower. They were also more effectively harnessed so that artillery trains following the armies were actually much shorter and less prone to breakage and accidents slowing them down. This ensured effective mobility. Thus, by following Gribeauval's system, firepower was doubled and the French Army, in one stroke, went from having a relatively weak and outdated field artillery system to having one of Europe's most redoubtable and modern.

The new artillery was also more likely to hits its target as the windage (space between the diameter of the barrel's bore and the diameter of the cannonball) was lessened. To take aim there was an adjustable backsight instead of a simple notch cut on the top of the gun's rear. Range was improved too so that a Gribeauval gun, although much lighter, was more likely to hit its target at a greater distance. The effective range for the various sorts of ammunition was as follows:

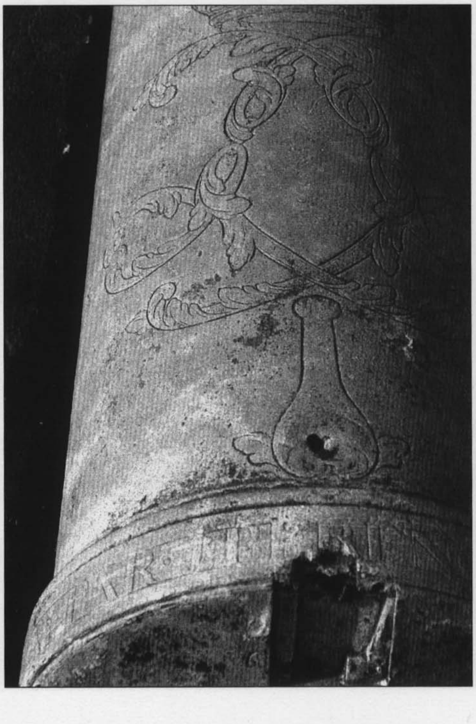
	BALL	GRAPE	CANISTER
12-pdr	900–1,000m	500–700m	500m
8-pdr	800–900m	400–600m	400m
4-pdr	800–900m	300–500m	300m



Gribeauval 12-pdr brass gun cast by Berenger at Douai on 24 March 1766. (Fort Ticonderoga, photo by René Chartrand)

The role of guns of weaker calibres, which had been so popular in the War of the Austrian Succession and the Seven Years War, was reconsidered. Some officers, including Gribeauval, felt they did not hold any tactical importance on the battlefield as their firepower was weak owing to the fact that they were scattered amongst the battalions. Their numbers were greatly reduced, but they were not totally abolished. The largely useless 4-pdr Swedish guns that had been introduced in 1757 (two per battalion had been prescribed by royal order but not always delivered) were now removed from those battalions that had them, although some were kept in service to defend supply convoys. The 1-pdr Rostaing guns were considered useless by Gribeauval and eventually withdrawn from the metropolitan army. However, a few were sent to regiments of colonial troops in the East and West Indies. Despite these reforms, the battalion guns served an important role in giving confidence to the infantrymen marching in line to battle and would reappear later. Whatever the technical virtues of the new artillery, its major role was still to support the infantry.

Manoeuvre of the field artillery was greatly improved by a few of Gribeauval's simple but enlightened inventions. The gunners were equipped with a *bricole*, a drag-rope carried on a shoulder belt, with which they could easily pull their guns into position. Sets of levers made pointing a lot more efficient and a screw elevating device to aim the barrel was quicker and more precise. The split trail held an ammunition box placed between its cheeks when travelling. This was put on the limber when the gun was set up for action providing an immediate source of ammunition. The *prolonge*, a long rope, fastened the rear of the carriage to the limber. The gun could therefore be pulled back some distance without hitching it up again



Royal cipher of Louis XV on a Gribeauval 12-pdr brass gun cast by Berenger at Douai on 24 March 1766. (Fort Ticonderoga, photo by René Chartrand) to the limber. The rounded rear of the carriage prevented the gun being stuck in the ground while being pulled by the *prolonge.*

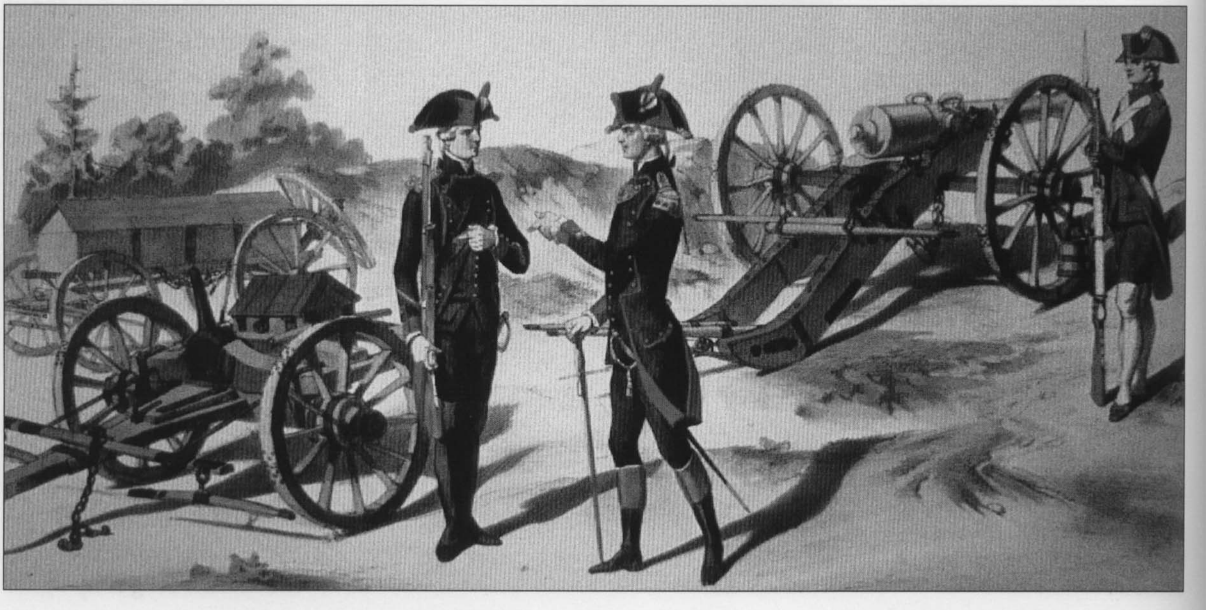
Matériel was improved in quality. Carriages were better made and sturdy. Their axletrees were of iron instead of the more breakable wood. Wheels were increased in size and solidity. Harnesses had wooden poles rather than only leather and rope, which made them more solid and easier to handle. The way horses were placed, two by two, greatly reduced the length of artillery trains on the march.

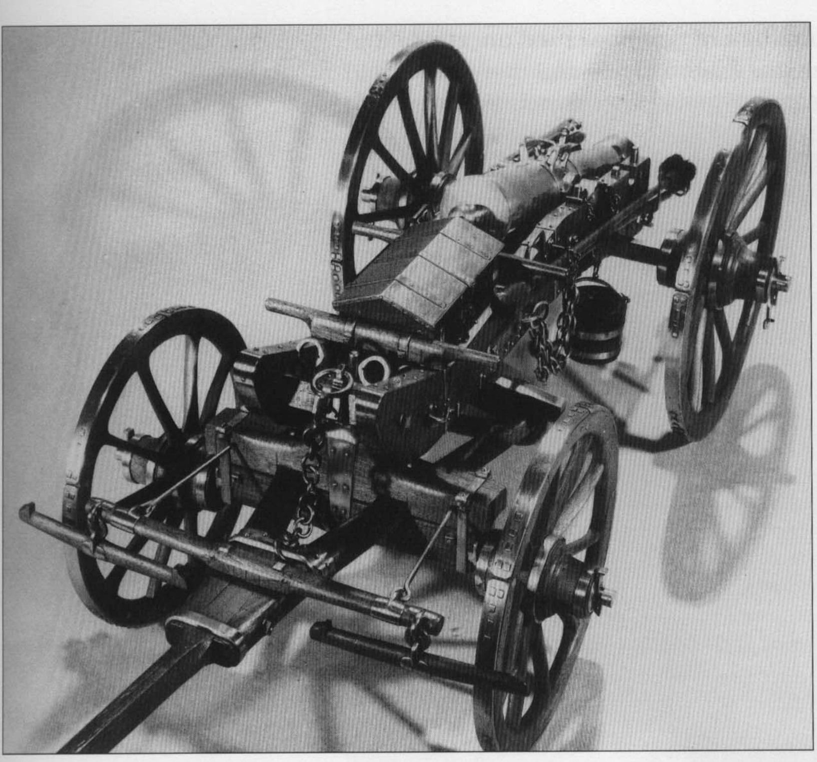
STANDARD MANUFACTURE AND EXPERT SERVICE

From 1764, the brass to cast the guns was obtained by a mixture of one pound of tin for every ten pounds of copper. Sand of the finest quality, with some clay, was used for the mould taken from a metallic, usually pewter, pattern. Guns were cast solid with a core for the bore. After removing the cast and cooling off, the guns were prepared for boring. Thanks to a boring machine invented by Maritz, a gun founder at Strasbourg, the barrels were easily bored horizontally to their axis exactly at the centre.

One of the most important aspects of the system devised by Gribeauval was its principle of uniformity in all components. The aim was that any piece from a carriage, limber or caisson would be interchangeable. Previously, while the designs were the same, there could be many variations depending on the habits of the local blacksmith and workmen who made the vehicles. The result was that, although they looked the same from a distance, the parts were often unique to the blacksmith who made them. On campaign, when there was often damage from travel or weather, as well from enemy action, repairs would be hampered until a blacksmith or a skilled worker could make a suitable

The elements of the Gribeauval system: a brass field gun (an 8- or 12-pdr) with its limber and caisson (behind the limber), 1786. A sergeant, an officer and a gunner in the uniform of the *Corps royal de l'artillerie* stand in front. (Print after Marbot)



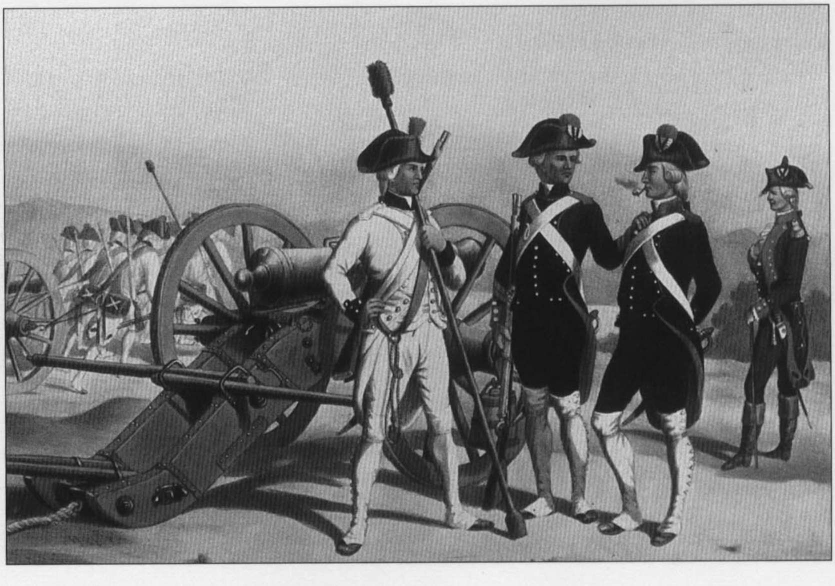


Model of a French Gribeauval 8-pdr brass field gun with carriage and limber. Note that the barrel is in the rear set of trunnion slots, which was done when in the 'travelling' position. (Bibliothèque Raoul & Jean Brunon, Musée de l'Armée, Château de l'Empéri, Salon-de-Provence, France. Raoul Brunon photo)

replacement. To remedy all this, Gribeauval had detailed specifications drafted up for distribution to all artillery workshops so that all components became as similar as possible.

Another of the vital points of the Gribeauval system was its attention to the duties of the men who served the artillery. Prior to its introduction, the service of the guns was much more haphazard. On campaign, a number of gunners would be selected to go with the pieces of artillery issued from the artillery park. They marched along with the guns, fired them in battle and marched them back to the park. After that, they had no further attachment to those particular guns and would go on to a different set on the next campaign.

Before Gribeauval's reforms, the role of the gunners on campaign could also be quite varied. They might be tasked with serving 24-pdrs one day and 8-pdrs the next. Thus, they were relatively unfamiliar with the best results their guns would give as expertise could hardly be acquired by constantly going from one calibre to another. A further negative aspect to the system was that gunners had no great affinity to their pieces and were liable to neglect them.



A Gribeauval 4-pdr field piece, *c.* 1786. Note the rods to manoeuvre the guns easily. The gunners wearing the white uniform are members of the reserve provincial artillery units (disbanded in 1789) and wear the *bricole*. Those in the background are shown pulling a field piece using their *bricoles*. Print after Moltzheim. (Anne S.K. Brown Military Collection, Brown University, USA, photo by René Chartrand)

In the new system, the organisation of manpower was altered so that gunners would remain with the same calibre pieces and therefore would acquire much more expertise. An additional benefit was that the men developed a much greater affinity with their pieces, ensuring that the material was kept in good repair.

The measurements (French measure) of the field guns were as follows:[4]

	Calibre of the gun bore	Calibre of the cannon -ball	Length (from the extremity of the base ring at the breech to the muzzle)	Weight	Gun crew	Horses
12-pdr field gun	4 inches 5 lines 9 points (121.3mm)	4 inches 4 lines 4½ points (118.1mm)	6 feet 6 inches (229cm)	1,800lbs (880kg)	15	6
8-pdr field gun	3 inches 11 lines (106.1mm)	3 inches 9 lines 7 ½ points (103mm)	5 feet 8 inches (200cm)	1200lbs (580kg)	13	4
4-pdr field gun	3 inches 1 1 line 4 points (84.0mm)	2 inches 11 lines 11½ points (80.1mm)	4 feet 6 inches (157cm)	590lbs (290kg)	8	4
6-inch howitzer	6 inches 1 line 6 points (165.7mm)	6 inches (162.4mm)	2 feet 9 inches 6 lines	650lbs (330kg)	13	4
1-pdr Rostaing gun	1 inch 1 lines 9 points (53.5mm)	1 inch 10 lines 6½ points (51mm)	4 feet 8 inches (151cm)	275lbs (134kg)		

Carriages, limbers and caissons

The rolling stock necessary to move the guns was an integral part of Gribeauval's system. Previous systems had a certain uniformity regarding carriages and limbers, with ammunition wagons mostly based on Saint-Rémy's designs of the later 17th century. With the Gribeauval system, the vehicles for moving the guns around were designed as part of the whole arrangement from the very beginning. Within its calibre, everything about a carriage and limber was to be interchangeable thanks to uniform construction plans used throughout the artillery corps. Caissons came in one size, but all their parts were also interchangeable and their interior set-up could be altered to carry various types of ammunition. All carriages, limbers and caissons had iron axletrees that were more solid and dependable.

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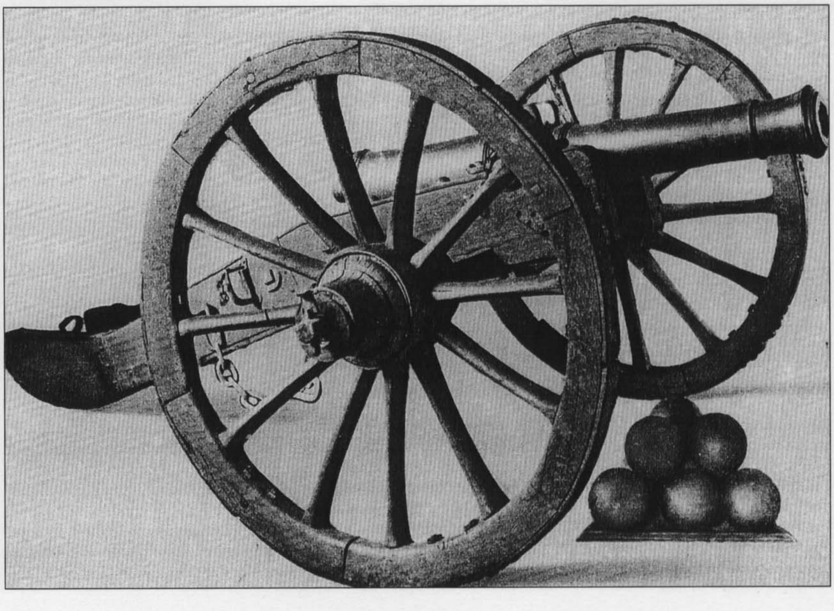
[4] The (French) measurements given in this book are the most important ones. Many more appear in the original books by De Scheel (1795) and Gassendi (1789, 1801) and these should be consulted for the complete tables of measurements. In English, specialised readers may wish to consult De Scheel's *Treatise on Artillery* (Bloomfield, Ontario, 1984), Donald E. Graves' outstanding annotated edition of the 1800 American edition. The tables were translated into American/British measures in the 1800 edition.

Carriages

	Length of the cheeks	Thickness of the cheeks	Height of the cheeks (at the aim curve)	Height of the wheels	Iron axletrees
12-pdr carriage	9 feet 3 inches 6 lines (293cm)	4 inches (108.3mm	12 inches (324.8mm)	4 feet 6 inches (146cm)	6 feet 5 inches (209cm)
8-pdr carriage	8 feet 9 inches 6 lines (285.6cm)	3 inches 6 lines (94.7mm)	11 inches (297.9mm)	4 feet 6 inches (146cm)	6 feet 5 inches 2 lines (209cm)
4-pdr carriage	7 feet 3 inches (235.5cm)	3 inches (81.2mm)	9 inches (243.6mm)	4 feet 2 inches (135cm)	6 feet 11 lines (197.4cm)
6-inch howitzer carriage	8 feet **3** inches (268cm)	3 inches (81.2mm)	1 foot 3 inches (406mm)	4 feet **6** inches (146cm)	6 feet 7 inches 4 lines (214.7cm)

Limbers

	Length	Height of the wheels	Iron axletrees
12-pdr and 8-pdr limbers	5 feet 3 inches 6 lines (172cm)	3 feet 6 inches (113.7cm)	5 feet 11 inches 6 lines (193.5cm)
4-pdr limber	4 feet 9 inches 6 lines (155.6cm)	3 feet 2 inches (102.8cm)	6 feet 11 lines (195.1cm)



Gribeauval 4-pdr brass field gun with its carriage, *c.* 1809–13. Marked LIBERTE — EGALITE (Liberty, Equality) and the letter A.N. (arsenal national) dated AOUST 1793 THURY A PARIS (August 1793, Thury at Paris). This gun was captured by Portuguese troops at the battle of Vittoria (Spain) on 21 June 1813. It is preserved in the Museu do Ejercito in Lisbon. (Print after Ferreira Martin)

Caissons

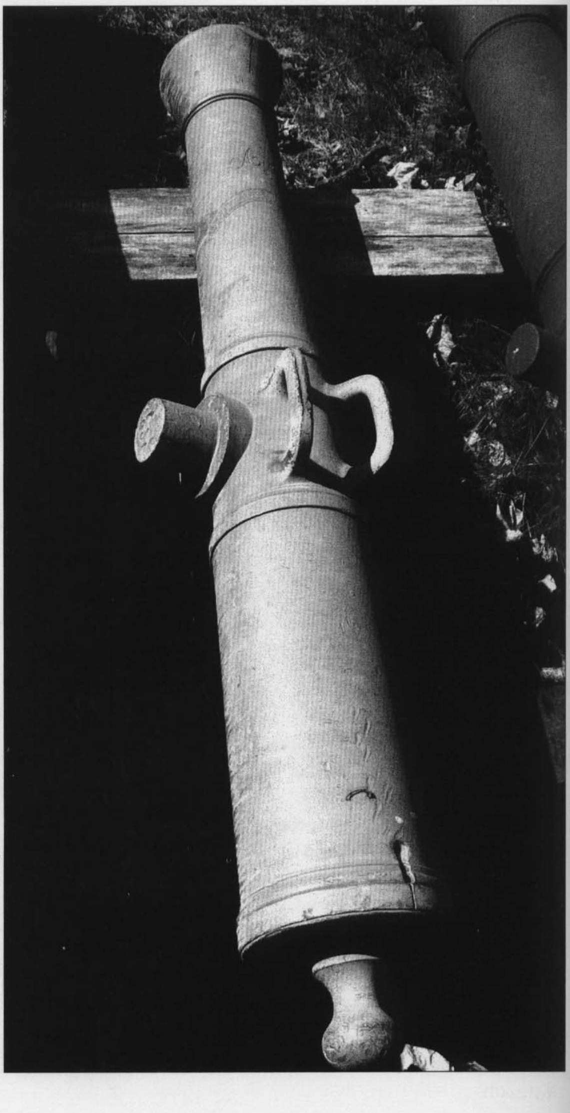
The caissons, or ammunition wagons, were first proposed by Gribeauval in 1754 although only put into service from 1765. These caissons had a design that was suited for each calibre and could also be adapted to carry various types of ammunition. See Plate C for more details.

VALLIÈRE COUNTER-ATTACKS

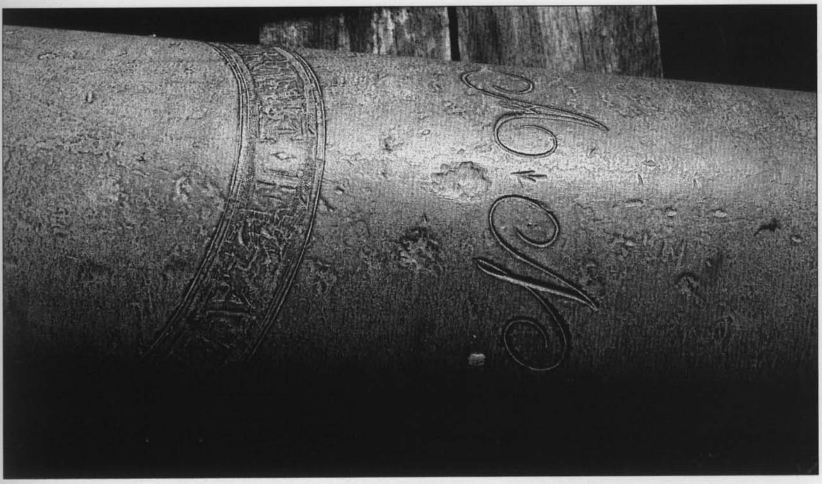
When General de Vallière came back to France in 1764, he found to his dismay that Choiseul would not reinstate him as Director-General of Artillery and that Gribeauval was in fact in command and changing the old system. However, Vallière had powerful friends at court who could not stand Choiseul's government and embarked on a crusade to discredit the reforms. This did not meet with great success as long as Choiseul was in power and, for a time, Vallière was sent out of the country on a mission to Naples. By 1770 Choiseul's power was slipping and he was removed from the cabinet in December. At this point the new system was largely in place. The royal foundries had cast some 1,200 brass 12-, 8-, and 4-pdrs. Over 1,300 carriages, 2,000 caissons and limbers had also been made. Artillery magazines had been constructed in various places and nearly 8,500 men were now in the artillery, up from some 4,800 in 1755. The Gribeauval system was thus largely in place and only needed another 1,000 wagons for the field artillery.

However, there were gaps. As it was not so urgent to rearm the siege and fortress artillery, these were still largely using the old 1732 Vallière system equipment or naval heavy guns. Another gap was the perceived absence of light artillery, as many regiments still preferred to keep hold of the light-calibre battalion guns. Assurances that the gunners' support to the infantry would continue and that there would be increased firepower from the new system did not convince everyone. Finally, the nine artillery directorates in the various regions were supposed to have a supreme commander to coordinate them, but there was reluctance to give such wide powers to one individual.

In 1771 the Marquis de Monteynard was appointed as minister of war. While not a partisan of one system over the other, the new minister was looking for ways to save money, something that he thought could be done by reinstating the Vallière system as it had required less personnel. In June 1772 General Vallière was reappointed Director-General of Artillery, ensuring a return to his father's system, which was ordered on 23 August.



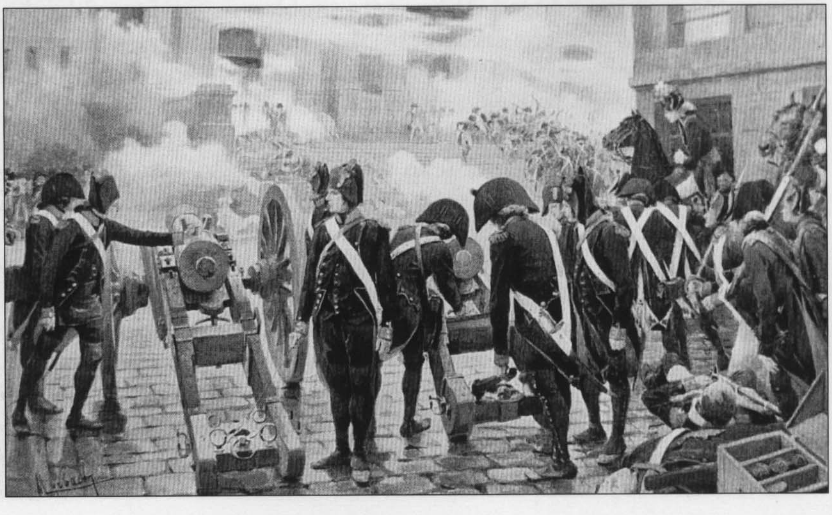
Gribeauval 4-pdr brass field gun barrel cast by Perrier et Frères in Paris, 1793. (Fort Ticonderoga, photo by René Chartrand)



'AN' with 'Liberté' and 'Égalité' below engraved on the barrel of a Gribeauval 4-pdr brass field gun cast by Perrier et Frères in Paris in 1793. 'AN' stood for Arsenal National (national arsenal) and the new republic proclaimed its ideals of liberty and equality even on its gun barrels. (Fort Ticonderoga, photo by René Chartrand)

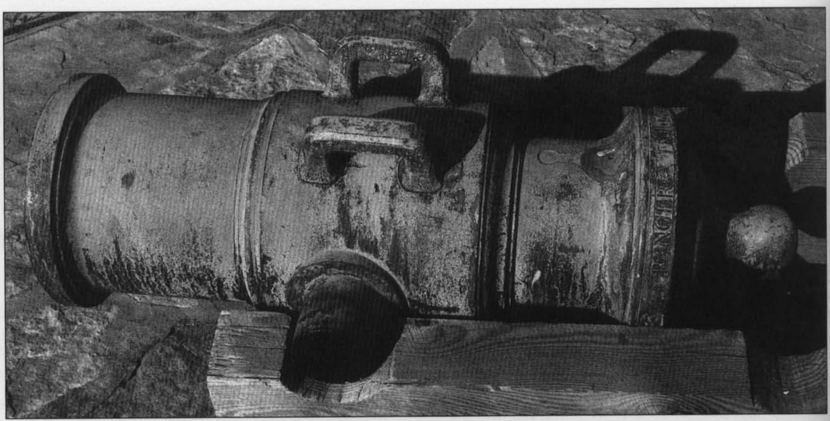
Far from solving problems, this decision doubled them. The officers of the artillery corps were divided into two camps over the relative merits of the two systems, it was also unthinkable to melt down and recast the many new Gribeauval guns, whilst the creation of so many new carriages would have been an unbearable expense. Monteynard proved to be an unsuitable minister and, in February 1774, was replaced in rapid succession by d'Auguillon, de Muy and Saint-Germain. A council made up of marshals Richelieu, Contades, Soubise and Broglie was quickly formed to solve the ongoing artillery dispute. These marshals had seen Vallière's heavy guns in action on campaign during the Seven Years War and welcomed Gribeauval's new approach. On 3 October 1774, a royal order reinstated the Gribeauval system, with Gribeauval himself appointed as First Inspector-General. This finally ended the political infighting. In the years to follow, Gribeauval was secure to improve various elements of the system that bore his name.

One notion that came up from time to time was whether iron might not replace brass for making the army's guns as it was substantially cheaper. Iron was widely used in the navy but, for campaigns on land, there were important reasons why artillery officers insisted on brass. The most important factor was that a gun cast in brass was lighter than one cast in iron. As the mobility of field artillery was of utmost importance, iron guns were unsuitable. Another factor was that brass barrels remained cooler than iron when fired rapidly. This reduced the risk of accidental premature firings. Furthermore, trials had shown that brass guns were more durable and could remain serviceable for about 3,000



General Bonaparte's artillery firing to quell the insurrection in Paris against the republican government on 5 October 1795. In this remarkably accurate depiction of artillery manoeuvres, a gunner on the left is piercing with a long priming pin (invisible as it's in the vent) the bag containing the powder charge in the gun's barrel. The gun to the right is being placed in position with the pointing lever, and the screw under the barrel is being used to adjust the barrel's position. Note the open ammunition box at bottom right. (Print after F. de Myrbach)

shots. Iron guns, it was argued, would not take as many shots without stress and cracks appearing in the chamber that could lead to the barrel bursting. Thus, the initially higher cost of a brass gun was compensated by its longer life and the safety of the gunners. For all these reasons brass remained the metal of choice for casting field guns.



Gribeauval 6-inch brass howitzer cast by Berenger at Douai on 22 May 1779 and marked '27'. (Fort Ticonderoga, photo by René Chartrand)

The first major campaign where the Gribeauval system was deployed was with General Rochambeau's army in the United States from 1780 to late 1782. On the whole, the train of field and siege artillery with Rochambeau's French expeditionary corps performed very well, especially the siege artillery at Yorktown in 1781. The field artillery with the French Army consisted of eight 12-pdrs, 16 4-pdrs and six 6-inch howitzers. The first action occurred on 19 July 1781, when two 12-pdrs and two 6-inch howitzers at Tarry Town beat off British boats that threatened supply lines on the Hudson River. They then moved to the British stronghold at Yorktown, Virginia, a 900km march from Providence, Rhode Island, where the French Army had landed. The four 12-pdr field guns and two 6-inch howitzers (alongside two siege 24-pdrs) in Boisloger's battery covering the York River were able to destroy all the British ships moored in the river. At Gloucester Point, on the northern side of the river, Gribeauval's 4-pdrs were sufficient to cover the British enclave there.[5]

The excellent training of the French artillerymen, largely brought about because they were part of an integral artillery system (and not just a lot of new guns), became apparent in action, and they were technically superior to their enemy. The equipment of the Gribeauval system was much lighter than its predecessor and was able to move around the American roads with less difficulty than British or American *matériel* of comparable calibre and load. However, a problem encountered by the trains of French artillery serving in the United States during the American War of Independence was that the travelling forges were unsuitable and often lacking in tools. General Manson, an artillery officer veteran of the campaign, suggested after the war that the forge wagons should have four rather than two wells and Gribeauval agreed.

ARTILLERY UNITS

The officers and men who served in the French artillery were part of a number of complex organisations. France then had Europe's largest establishment of artillery and artillery support units performing a wide variety of duties in various stations. Until 1789, the various distinct units were:

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[5] See in particular Brendan Morrisey's Campaign 47: *Yorktown 1781* (Osprey, Oxford, 1997) for an account of this campaign with details on the participating armies and fleets.

Gribeauval 6-inch brass howitzer cast by Berenger at Douai on 19 June 1779 and marked '28'. (Fort Ticonderoga, photo by René Chartrand)

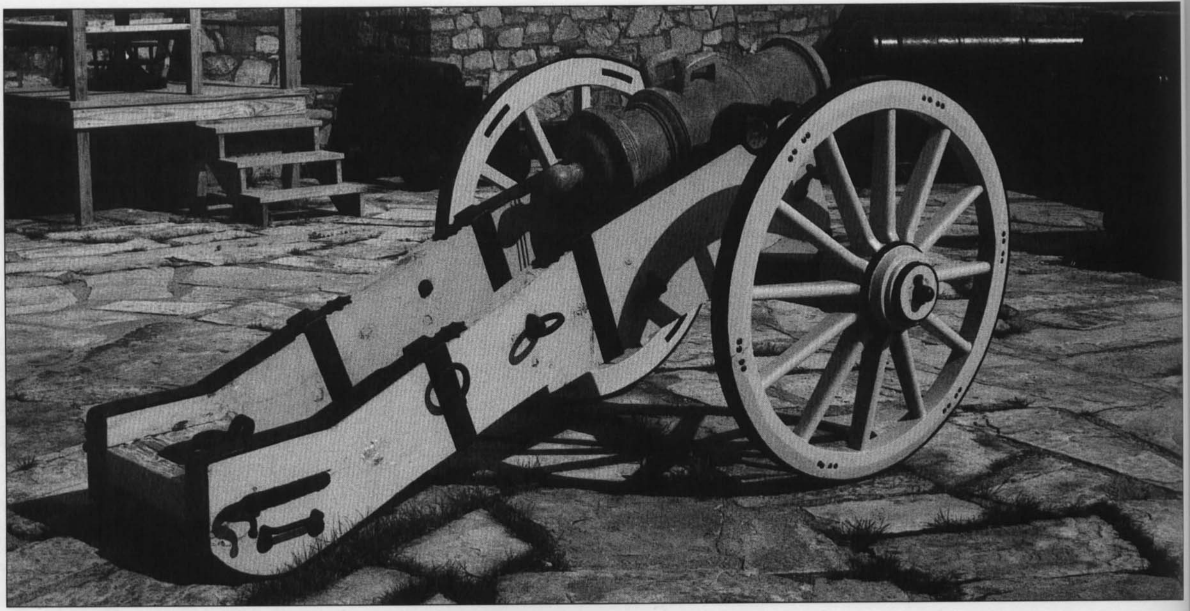
1) The *Corps royal de l'artillerie* (Royal Corps of Artillery) was by far the most important. This was the metropolitan army's artillery arm and provided the regiments of artillery (named La Fère, Metz, Besançon, Grenoble, Strasbourg, Auxonne and Toul). The corps also had numerous specialist services attached to it such as ordnance officers, who worked on new designs; artisans; forges; transport; etc. As a reserve, there were seven Provincial Militia artillery regiments, one attached to each regular regiment. These were mobilised in wartime and also provided recruits for the regular units.

2) The French Navy had a totally separate artillery arm from the army. It had its own corps of ordnance experts who designed their own distinct systems that were different to those of the army. To serve these guns on board ships, it had the *Corps royal des cannoniers-matelots* (Royal Corps of Gunner-Sailors), the *Corps royal de l'artillerie des colonies* (Royal Corps of Colonial Artillery) for land service in the colonies and in metropolitan naval bases, and the *Corps des canonniers gardes-côtes* (coastguard artillery) serving in coastal batteries along France's Atlantic and Mediterranean coasts.

Army artillery

In 1790, during the early months of the French Revolution, the French Army's *Corps royal de l'artillerie* had seven artillery regiments, six companies of miners and 10 companies of *ouvriers* (artisans). They had a peace establishment of 8,663. An ill-advised revolutionary government decision was the disbandment of the seven provincial militia artillery regiments. This wiped out the corps' reserves, although many of these trained men would later reappear as volunteer gunners. On 1 April 1791, the seven army artillery regiments, which had been known by their regimental and school names, were designated by numbers:
La Fère = 1st, Metz = 2nd, Besançon = 3rd, Grenoble = 4th, Strasbourg = 5th, Auxonne = 6th and Toul = 7th.

At the same time the companies of *ouvriers* and miners, which had been known by their captains' names, were henceforth numbered. The 'royal' prefix was dropped during the summer of 1792 following the proclamation of the republic in France. On 27 August 1792, the 8th foot artillery regiment was formed by the transfer of the colonial artillery corps from the navy to the army. A 9th foot artillery regiment was raised in 1794 but disbanded a year later. In 1804, when Napoleon became emperor of the French, the 'imperial' prefix was added to the



Gribeauval 6-inch brass howitzer cast by Berenger at Douai on 17 July 1779 and marked '29'. Mounted on its Gribeauval system carriage. (Fort Ticonderoga, photo by René Chartrand)

name, which became the *Corps impérial de l'artillerie* (Imperial Corps of Artillery). The 9th regiment was raised again on 18 August 1810 by the incorporation of the Dutch artillery into the French Imperial Army. This was disbanded on 12 May 1814.

Horse artillery

During the 18th century there were a number of different proposals and experiments all aimed towards bringing field guns up quickly to the point of action. The Prussian Army of Frederick the Great took the first step and, on 21 April 1759, Frederick formed a battery of six 6-pdr guns, each gun being pulled by six horses, harnessed in pairs with three drivers, and served by a detachment of seven mounted gunners. Although destroyed in subsequent battles, largely due to undependable drivers, Frederick nevertheless was convinced of the tactical need for horse artillery and it was retained permanently in the Prussian Army. This was known as the 'detachment system'.

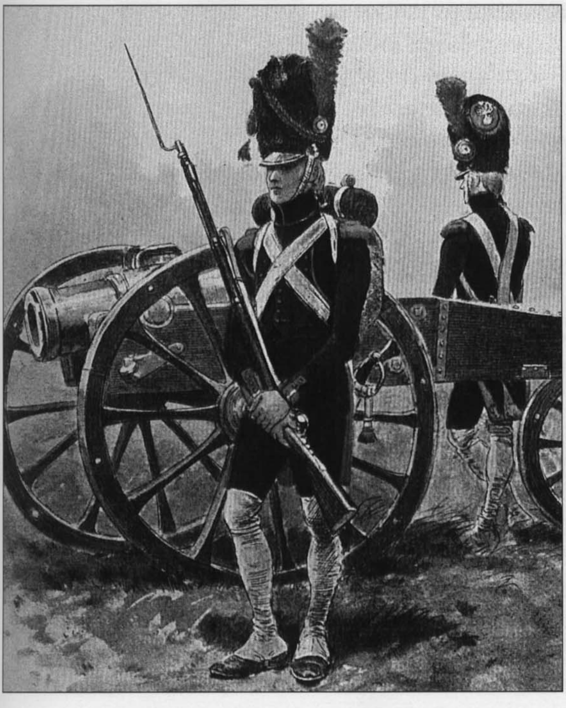
The Russians followed suit in 1762 in imitation of the Prussians, and in 1778, light artillery batteries were created in the Austrian Army. These consisted of six 6-pdr guns pulled by six horses and a 7-pdr howitzer pulled by four horses. The caissons (ammunition wagons) followed these guns. The great difference from the mounted Prussians was that the Austrian gunners sat astride the padded tops of the caissons, five gunners per wagon with a sixth riding on the off-wheel horse of the team pulling the wagon. This type of ammunition wagon was nicknamed the Würst caisson because of its shape, reminiscent of a sausage. This was known as the 'car system'.

The French were observing the evolution of light artillery. As early as 1762, M. de Vregille, an artillery officer campaigning in Germany, had improvised a small train that had only one caisson per gun and mounted the gunners on horses. The idea of creating horse artillery batteries was suggested by de Vregille to Gribeauval. The great reformer of France's artillery had noted the light artillery experiments when he was attached to the Austrian Army. Back in France in 1764, he mentioned to the Duke of Choiseul, minister for both the War and the Navy departments, that France should also have this type of artillery. Choiseul was then struggling with all sorts of issues in reorganising the French Army and Navy and having a hard enough time keeping his forces suitably supplied. As good as the idea was, wrote Gribeauval to Vregille, the timing was wrong. He too was fighting tooth and nail to 'destroy old prejudices' so as to modernise the whole artillery. Thus, 'for the present', Gribeauval concluded, 'it would be wanting too much'. The new concept would just have to wait.

The effects of the French Revolution brought about a new opportunity. Young officers carried the idea to the new National Assembly, which, on 28 September 1791, recommended the formation of light artillery units. The minister of war Narbonne was enthusiastic and, in January 1792, allowed two such companies to be experimentally raised in Metz while convening a board of officers to push the idea forward. On 17 April, the speedy creation of nine companies of horse artillery was decreed and the remaining seven companies were raised in May. They were organised on the Prussian detachment system but the new French horse artillery was superior in that all its gunners were mounted. Every gunner was trained as a cavalryman and the battery could therefore gallop and keep up with the cavalry, giving this arm its own quick-moving firepower. Each battery was equipped with six 4-pdr guns and a 6-inch howitzer.

The horse artillery companies became an important part of the new mass-levied French armies. Every general in the field clamoured for them and the number of units was greatly increased during 1792/93 going from nine to 40 companies each consisting of 100 men. The companies were initially attached to existing foot artillery regiments but, by the summer of 1793, this system had become unmanageable. There were also some independent horse artillery units raised spontaneously from volunteers. On 7 February 1794, a new artillery arm was created by an order to organise the existing companies into eight regiments, each having six companies and a depot. They were mostly organised with gunners mounted on horses but some had Würtz caissons. The new regiments, numbered 1 to 8, were organised during the spring and summer of 1794. A 9th regiment was raised in 1794 but disbanded on 9 September 1798. The 8th and 7th regiments were disbanded respectively in January and December 1801. Another 7th horse artillery regiment was raised in August 1810 by incorporating the Dutch horse artillery, but it only had two companies and these were incorporated into the 1st and 4th regiments in February 1811.

Dressed in a fashionable hussar-style uniform of blue with red facings and cords, the horsed gunners acquired a rather elitist style and attitude comparable to the French cavalry of the period. This attitude was strengthened by the fact that they



A 6-inch howitzer of the Foot Artillery of the Imperial Guard, *c.* 1808–15. (Print after Maurice Orange)

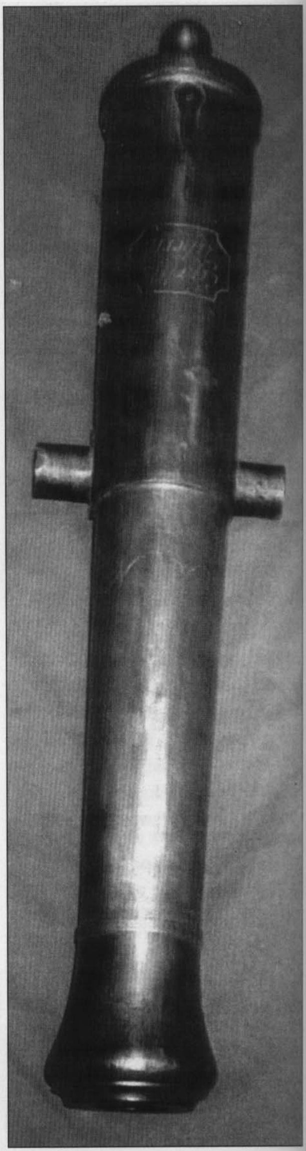
were drawn from the fittest and best young men in the foot artillery and had a higher pay. However, this pay was certainly earned. A horse battery would move ahead of the main force under fire from the enemy's usually heavier-calibre guns, its salvation residing in returning rapid fire, ideally twice as fast, from its lighter guns. It could be useful as a mobile reserve to the forward units of an army, ready to be deployed at a critical moment when the commanding general spotted a weakness in his enemy's army. This was one of Napoleon's favourite moves and he used it with great effect in several battles. While such tactics were effective, the horse artillery could suffer heavy casualties due to their exposure to enemy fire.

The most famous of Napoleon's horse artillery was his guard regiment. It had its origin as a section of 30 mounted gunners organised on 30 May 1797 as part of the Corps of Guides of the General-in-Chief of the Army of Italy, General Bonaparte. It was increased to a half-company, part remaining in Italy, part going to Egypt with its general in 1798. During the Egyptian campaign, General Bonaparte augmented the detachment to a half-company of 60 men serving three field pieces. Back in France in 1800, the detachment was raised to a company of guard horse artillery on 3 January and it fought at the battle of Marengo. Napoleon had by then become First Consul and formed his Consular Guard, including horse artillery, which was augmented to two companies in 1802. It was recruited from the line regiments and each candidate had to be the veteran of three campaigns, know how to read and write, have good conduct, be 25 years of age and measure between 1m 78cm and 1m 64cm. By 1804, the detachment had 24 guns. It was elevated to be the Horse Artillery Regiment of the Imperial Guard on 15 April 1806 consisting of six companies, two to each squadron, each squadron having 100 experienced gunners and 50 apprentice *vélites.* It was reduced to four companies when the Foot Artillery Regiment of the Imperial Guard was formed in August 1808 but later raised again to six. It was disbanded in May 1814 following Napoleon's abdication.

Pontonniers battalions

The increased mobility of French armies in the 1790s brought about the need for a unit specialised in the setting up of pontoon bridges across rivers. In Napoleon's army, pontoon troops were part of the artillery. The first companies of *pontonniers* were raised in Strasbourg from 1792, recruited from the city's bargemen and river sailors. By the following year they had reached battalion strength. A 2nd battalion was raised at Mayence in 1797. A 3rd battalion was created on 18 April 1813. On 12 May 1814, shortly after Napoleon's first abdication, the 2nd and 3rd battalions were disbanded. The 1st battalion was disbanded in late 1815.

In general, pontoon troops followed the army in fairly flat terrain, mainly in Germany and eastern Europe. They would drive long flat-bedded wagons (called *haquets*) upon which would be mounted a pontoon boat with planks, ropes, etc. The smaller boats were about 22 to 27 feet long by about 6 feet 10 inches or more in width. A larger version was 35 feet long. Coming to a river, the boats would be put in the water and, connected by planks and fastened with ropes, form a floating bridge that spanned the water between the two shores. In ordinary circumstances, it would take about a day to set up. These bridges were amazingly sturdy and field guns weighing two to three tons could cross



Light 3-pdr brass field gun barrel cast by Ramius at Le Creusot during the French revolutionary calendar of Brumaire, Year III (1794). This light gun cast at a private foundry is 105.5cm long. It has no handles and minimal mould rings, its design seemingly inspired by naval ordnance but cast in brass. It was probably meant to supply the need for light pieces to be attached to line infantry half-brigades. (Val Forget, Navy Arms, USA)

Breech detail of the light 3-pdr brass field gun barrel cast by Ramius at Le Creusot in 1794. The breech plate is engraved 'Ramius au Creusot Brumaire L'An 3'. (Val Forget, Navy Arms, USA)

easily. Pontoon boats could be much larger in some circumstances. The ones that spanned the mighty Danube River were 60 feet long, and the 169 needed to span the Pó River were 50 feet long. In mountainous country, bringing along pontoon boats on wagons was out of the question and the boats were built on the spot. At best, in mountainous country such as in Spain and Portugal, small 14-ft boats were split in two pieces, each half being carried on mules.

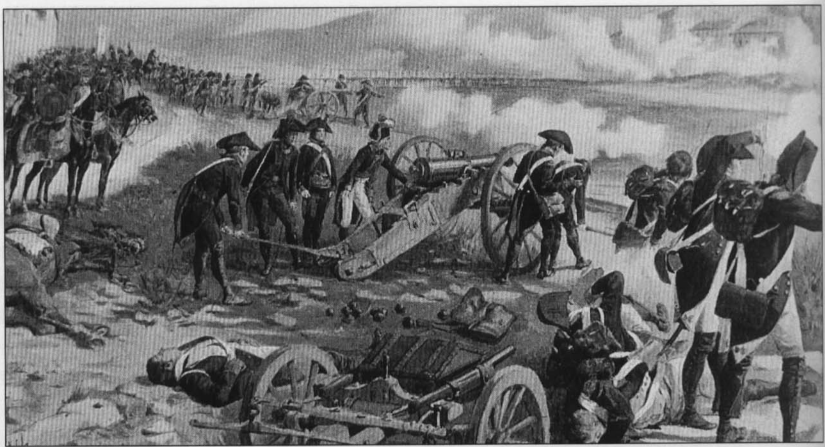
The artillery train

To work properly, the Gribeauval system had to have good drivers for its guns and caissons. These were provided by private contractors and were civilians. Stories of their reluctance to bring the guns up and thus risk coming under enemy fire abounded. As an artillery officer, Napoleon was not predisposed to the concept of civilian drivers, and as a general in the 1790s, he was frustrated by the civilian contractors as he could not be sure that his guns and ammunition caissons would be where he wanted them to be and on time. At that time, he had little power to change the system, only to make the drivers in his own command as effective as possible. In Italy, he managed to partly submit his contract drivers to military discipline, first by detaching soldiers to the train in May 1796 and then forming a even more militarised 'transport brigade' for each battery in his Army of Italy. In Egypt, far from home and its contractor lobbies, he simply went forward and organised a 12-company military artillery train battalion.

By 1800, Napoleon was back in France as its First Consul and thus now the ruler of the nation and master of its army. Almost as soon as he was in power, he decreed, on 3 January 1800 and 4 August 1801, the formation of militarised train battalions consisting each of six companies attached to foot artillery and horse artillery. General Marmont, who later claimed in his memoirs to have suggested the militarisation of the train, was put in charge of its organisation, which consisted mainly of drafting, uniforming, training and dividing up the former civilian wagoners into companies. Henceforth, they would be under military law and discipline. All this was accomplished rapidly and from then on the artillery and its caissons could be depended upon much more readily. Each foot artillery field gun and caisson was drawn by four horses (six for 12-pdrs), at least in principle. Later, during the campaigns in Spain and Portugal, mules,

Egalité
Liberté

'Egalité' and 'Liberté' (equality and liberty) engraved on the barrel of the light 3-pdr brass field gun barrel cast by Ramius at Le Creusot in 1794. (Val Forget, Navy Arms, USA)



As a former artillery officer, General Bonaparte would occasionally aim a gun in battle to encourage his men, as shown in this print of the battle of Lodi, 1796. A gunner is adjusting the placement with a pointing lever inserted in the carriage's trail while Napoleon finds the range by using the screw under the barrel. In the foreground, the ammunition box is correctly shown placed in the limber during action. (Print after F. de Myrbach)

more commonly used for transport in those countries, were prevalent amongst the foot regiments of field artillery.

As these were service battalions of men who would be under fire but not expected to fight except to defend themselves, NCOs led their companies. Generally, they were spectators rather than actors in a battle. To denote the difference, their uniform was light grey-blue or sky blue with dark blue facings rather than the gunner's dark blue with scarlet facings and they were only armed with a hanger. A captain, a lieutenant and a quartermaster, who were subordinate to artillery commanders, commanded each battalion. There were initially eight train battalions, then 10 in 1804, 11 in October 1805 and 13 in April 1808. On 18 April 1810 the 13 battalions were doubled to 26 and a 27th was added by incorporating the Dutch train in August 1809.[6] In addition, the Consular, later Imperial, Guard had its own train companies for its artillery contingents

Growth of artillery personnel

To be a fully operational and integrated system, Gribeauval's bold innovations needed manpower. These greatly increased numbers of artillery and auxiliary units brought a very large establishment of men attached to the ordnance services in the revolutionary and Imperial French Army. In 1801, there were eight foot artillery regiments, six horse artillery regiments, two battalions of *pontonniers*, 15 companies of *ouvriers*, eight train battalions and one horse artillery company of the Consular Guard, all of which amounted to 28,196, officers and men.[7]

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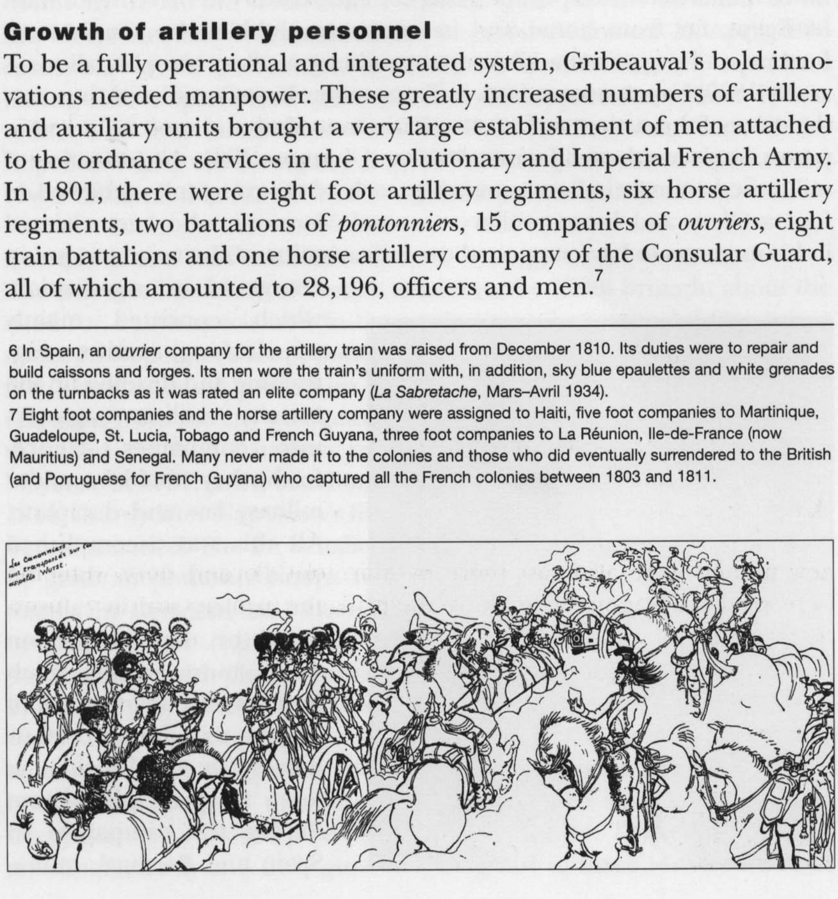
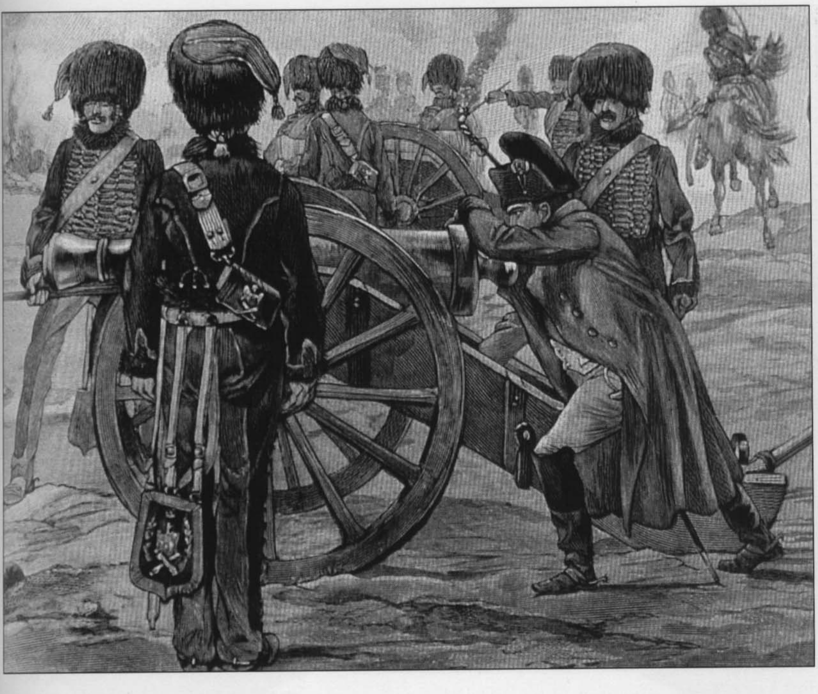
[6] In Spain, an *ouvrier* company for the artillery train was raised from December 1810. Its duties were to repair and build caissons and forges. Its men wore the train's uniform with, in addition, sky blue epaulettes and white grenades on the turnbacks as it was rated an elite company (*La Sabretache*, Mars–Avril 1934).

[7] Eight foot companies and the horse artillery company were assigned to Haiti, five foot companies to Martinique, Guadeloupe, St. Lucia, Tobago and French Guyana, three foot companies to La Réunion, Ile-de-France (now Mauritius) and Senegal. Many never made it to the colonies and those who did eventually surrendered to the British (and Portuguese for French Guyana) who captured all the French colonies between 1803 and 1811.


Les Canonniers sont transportés sur les caissons Würtz

Horse artillery with the gunners sitting on a *Würtz* type caisson, *c.* 1796. The 3rd Company, 2nd Regiment of Horse Artillery, reported having 14 *Würtz* caissons for its six guns in July 1796. (Print after Dorel)



Napoleon aiming a gun of his Imperial Guard Horse Artillery, c. 1805–10. (Print after JOB)

New staff offices and schools were set up and units strengthened so that, by the end of 1804 when Napoleon became emperor, the establishment was up to 35,865 officers and men. The numbers increased steadily during the next ten years. The Imperial Guard artillery also grew, its horse artillery achieving regimental status in 1806 and foot artillery being added from 1809. At length, the Imperial Guard artillery provided Napoleon with a reserve of 198 guns. By March 1814, the various army artillery units amounted to an establishment of 80,273 officers and men, although by that date, barely a month before Napoleon's abdication, the real numbers would have been lower. It was, nevertheless, an indication of what it took for a great nation to have effective artillery services as defined by Napoleon.

In May 1814, the new government of King Louis XVIII brought this down to an establishment of 17,041. The numbers went up as the regiments tried to expand during the 'Hundred Days' of Napoleon's return, which ended at Waterloo on 18 June 1815. Thereafter, the establishment was slashed to some 12,500.[8]

THE YEAR XI SYSTEM

The 4- and 8-pdrs of the Gribeauval system were not always found to be the best solution against enemy 6-pdr guns and several senior generals requested a weapon of similar calibre. There were complaints that the 4-pdr was of little use when firing canister shot, and that the 8-pdr was too heavy for medium field artillery. While in Italy in 1800, General Marmont reinforced his army's artillery with foreign guns, notably 60 Piedmontese 6-pdr guns cast in Torino. Some 40 howitzers 'of a new model' were also cast there by Marmont's order. Improvements were made to wagons by making them bigger in order to carry more ammunition and reduce the number of wheel models. Back in France, Marmont wrote a memoir to Napoleon, then First Consul, proposing changes to the Gribeauval system to reflect these developments. Marmont felt that a single 6-pdr calibre could replace both the 4-pdr, considered too light, and the 8-pdr, which was too heavy. The 6-pdr, he

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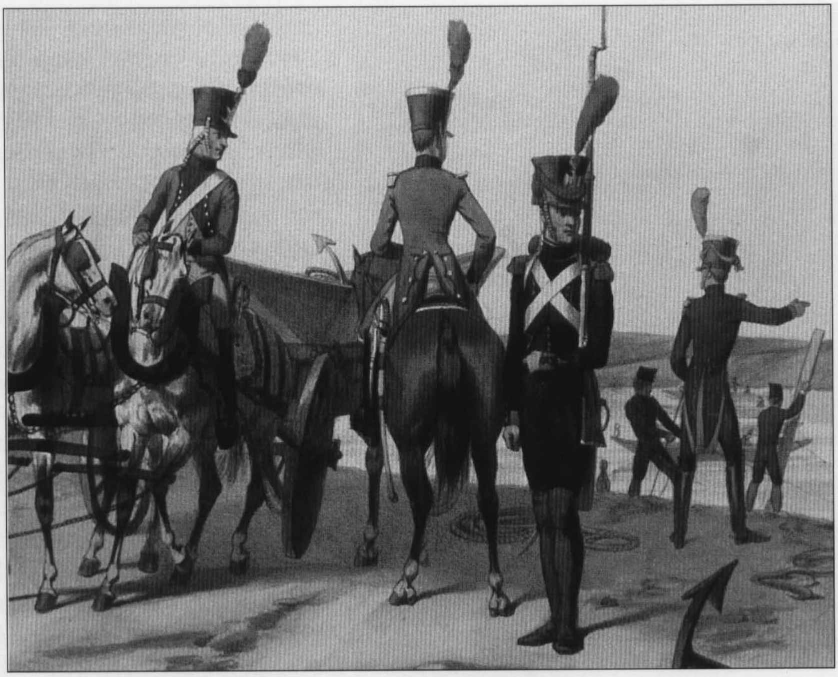
[8] These were divided between eight foot and four horse regiments, a battalion of *pontonniers*, 13 companies of *ouvriers* and artificers, eight train squadrons plus an artillery brigade of the royal guard, which included horse, foot and train regiments.

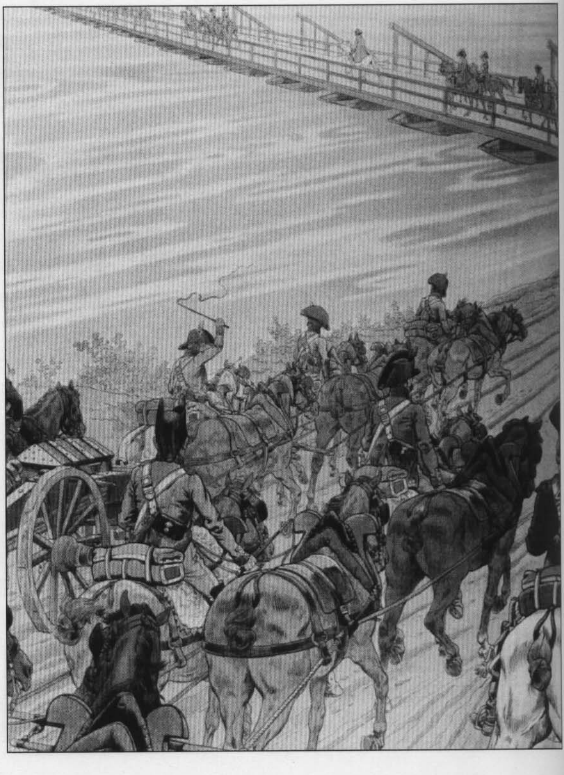


Drivers of the army's *Train des Equipages* (Wagon Train) driving a wagon holding a pontoon boat (left) with soldiers of the *Pontonniers* (right), 1808–12. Print after Marbot. Planche de Charles Hamilton Smith. (Anne S.K. Brown Military Collection, Brown University, USA, photo by René Chartrand)

argued, was almost as mobile as Gribeauval's 4-pdr and was almost equal in firepower to the 8-pdr. He also called for a new howitzer of 5 inch and 6 lines. Napoleon reacted with interest and, on 29 December 1801, appointed a commission of artillery officers to evaluate the existing system and make proposals to update it.

On 2 May 1803, the commission proposed a new 'Year XI' system[9], which featured: a short 24-pdr gun; long 12-pdr gun; short 12-pdr gun; long 6-pdr gun; short 6-pdr gun; 3-pdr mountain gun; 24-pdr (5 inch 6 lines) howitzer; and a 24-pdr (5 inch 6 lines) mortar

On the whole, the proposed new system favoured heavier calibres. Instead of 4- and 8-pdrs, the field artillery would have 6- and short 12-pdrs. However, it was not a report that met with unanimous approval. One of the best experts, General Gassendi, was opposed and at least three others also had reservations. The main arguments against the findings were, firstly, the considerable costs involved to change a system that was, for the most part, still quite up to date or ahead of the enemy's, and secondly, the fact that some 2,700 guns of 4- and 8-pdr Gribeauval system were available, with around three million cannonballs already cast for them.



Artillery train on the march, c. 1805. Napoleon militarised this important service in 1800, considerably increasing its efficiency. The harness for six horses was used for horse artillery or for pulling 12-pdr field guns. (Print after JOB)

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[9] So called because it was proposed on 12 floréal Year XI in the French Revolutionary calendar (introduced on 22 September 1792). Year XI went from 23 September 1802 to 23 September 1803. The calendar was abolished on 22 September 1805, the last day of Year XIV, when Napoleon sensibly ordered a return to the Gregorian calendar.

A: Gribeauval 12-pdr field gun

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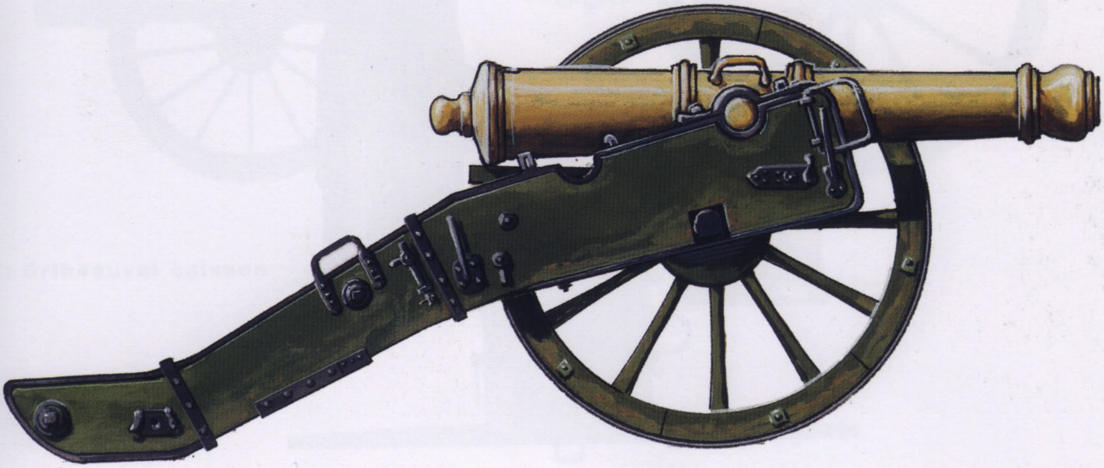

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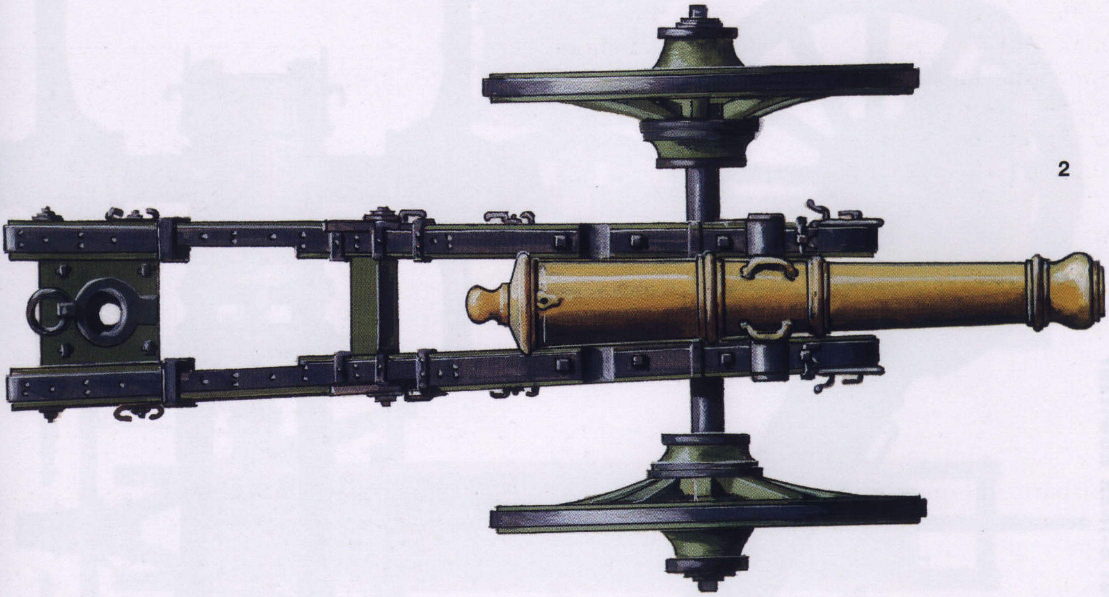

B: Gribeauval 6-inch howitzer

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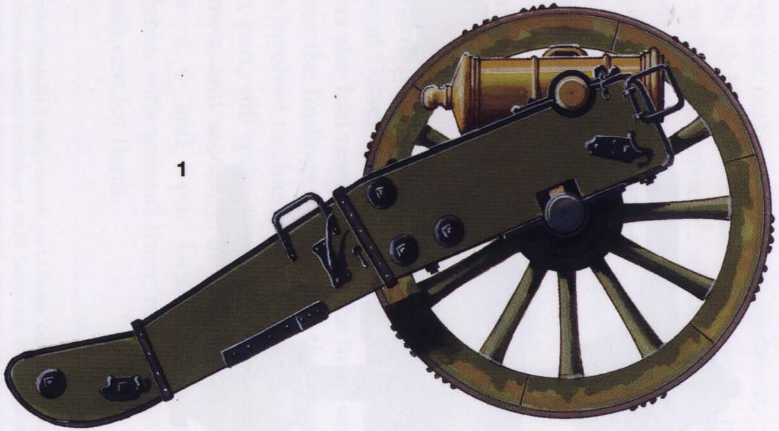

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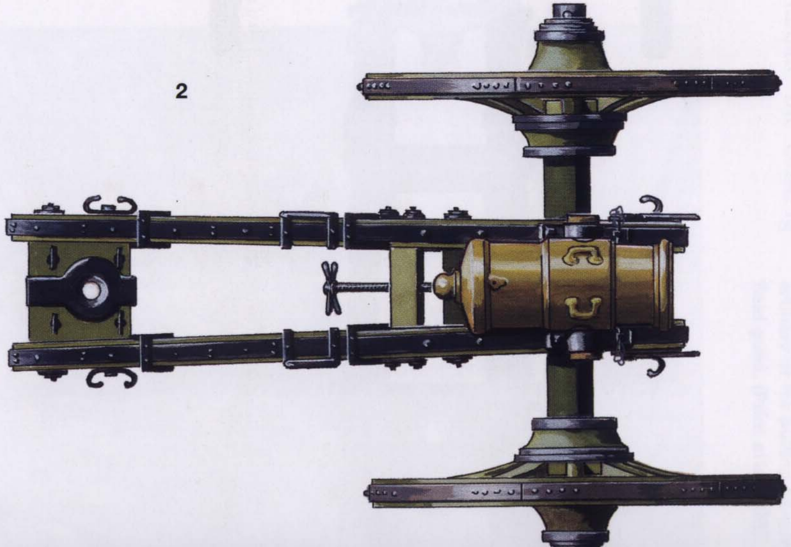

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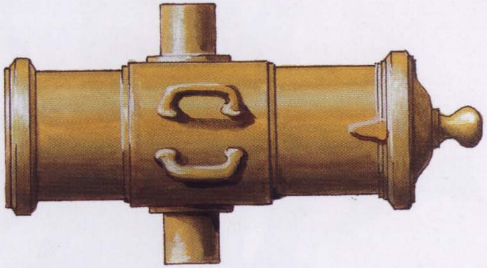

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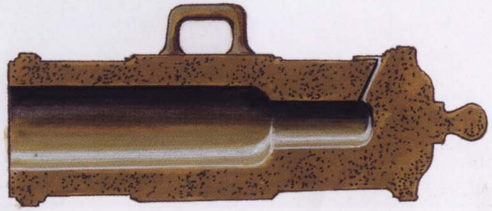

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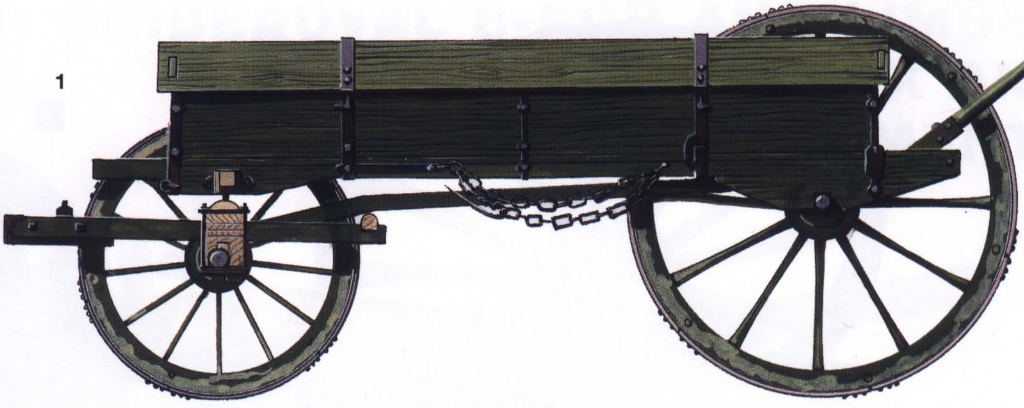

C: Gribeauval caisson

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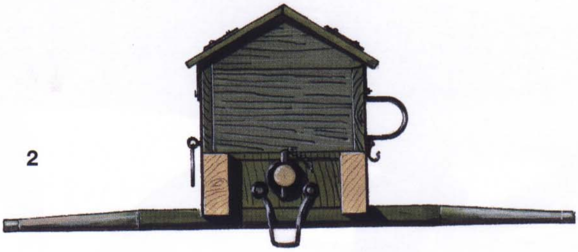

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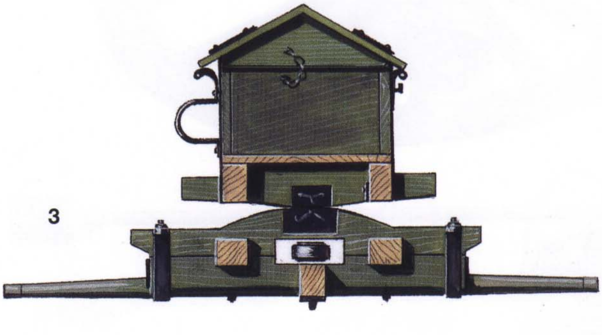

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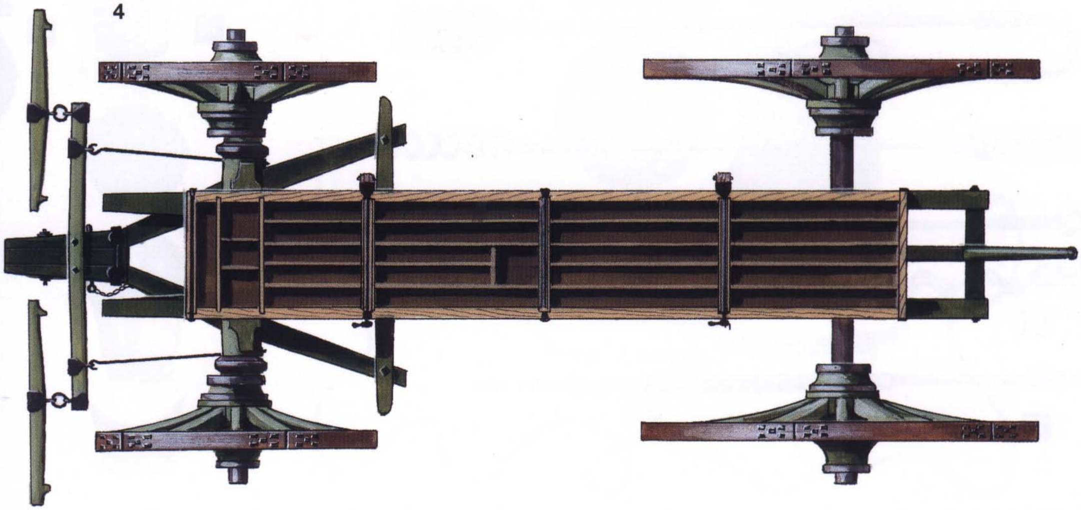

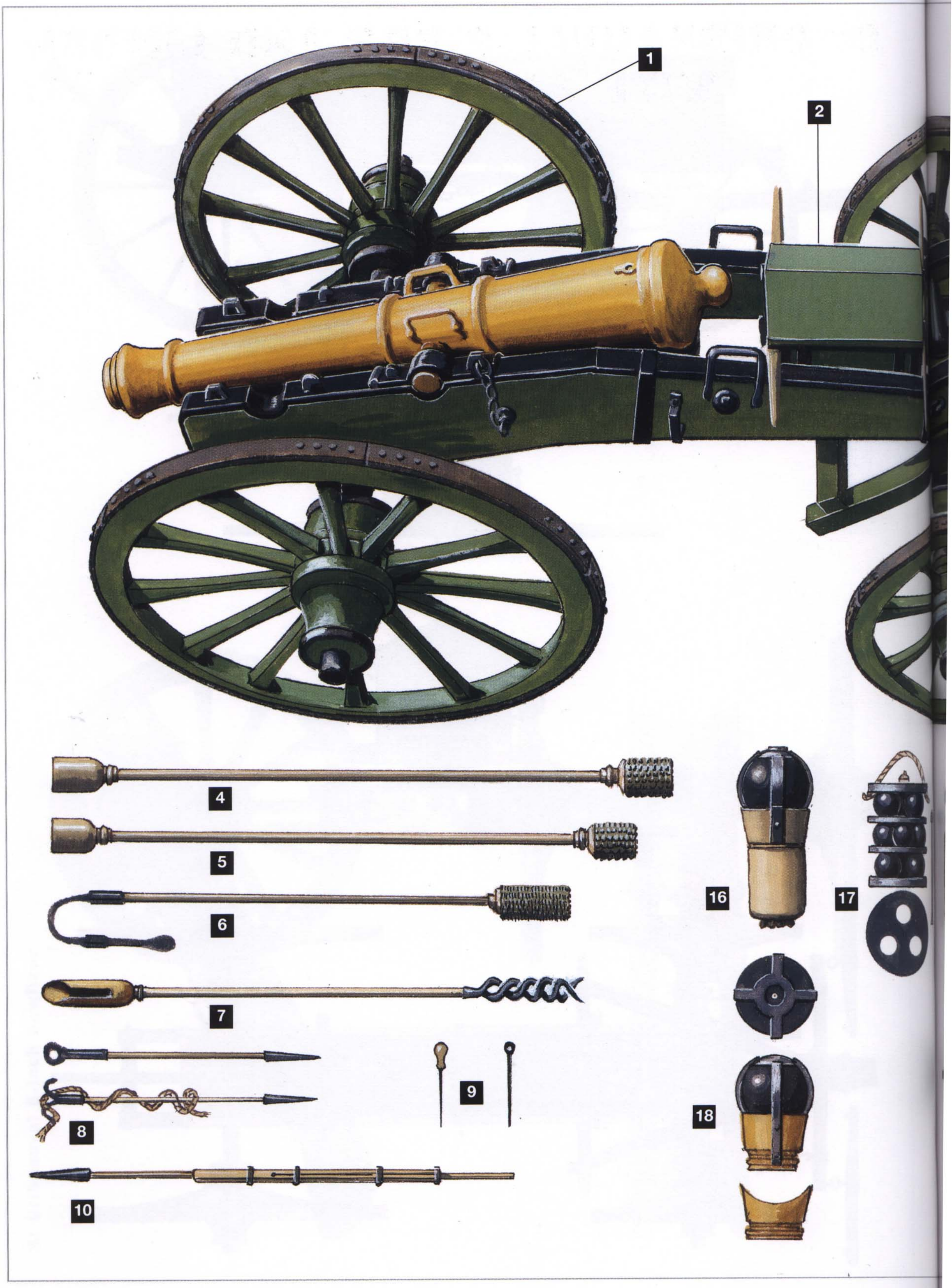
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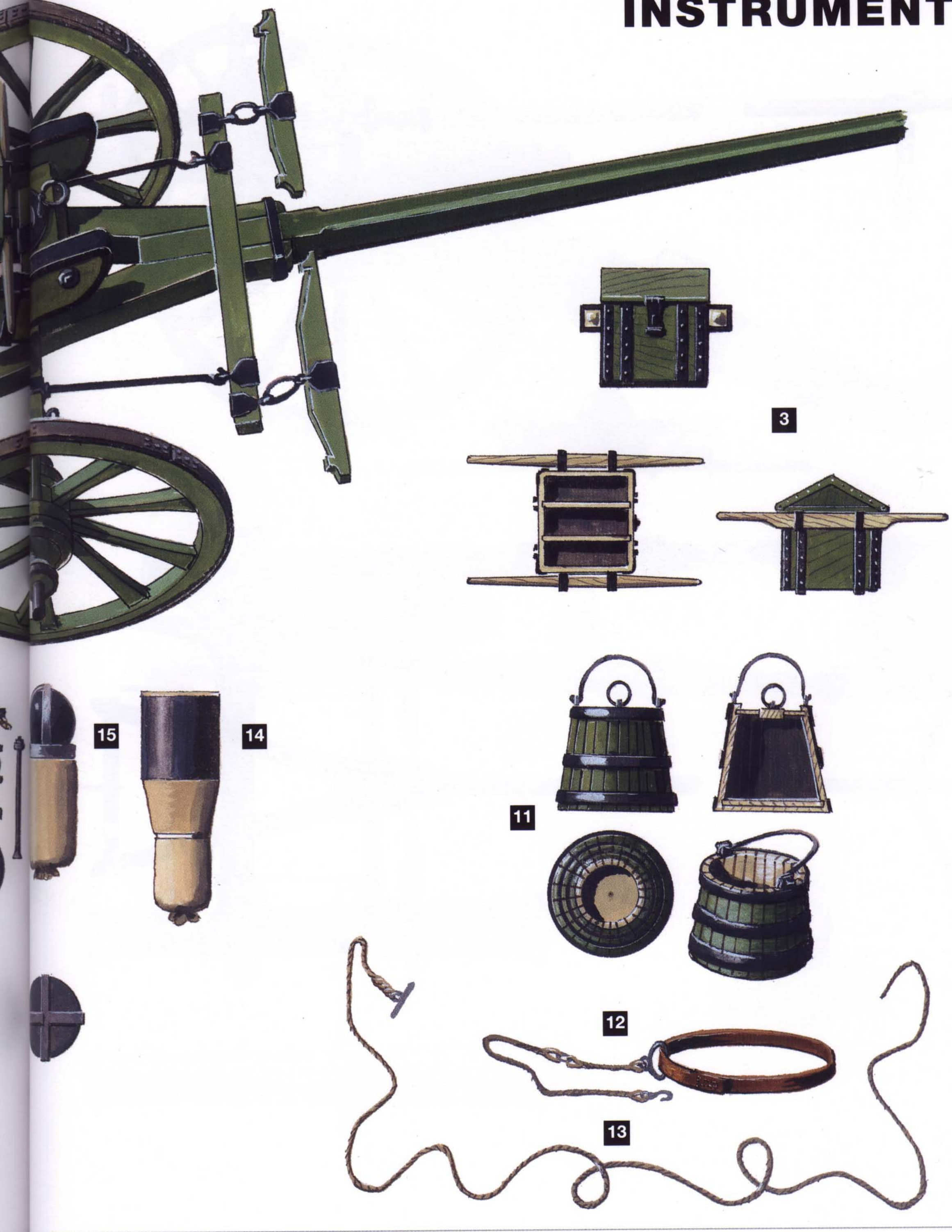
D: GRIBEAUVAL 8-PDR AND LIMBER WITH AMMUNITION BOX AND INSTRUMENTS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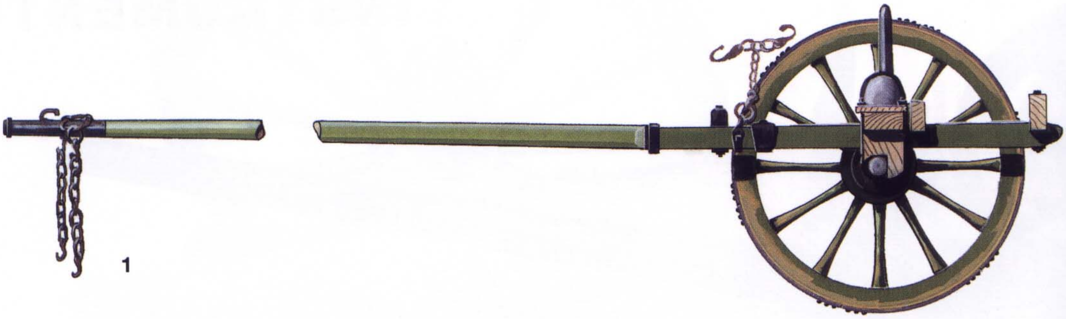
E: Gribeauval limber



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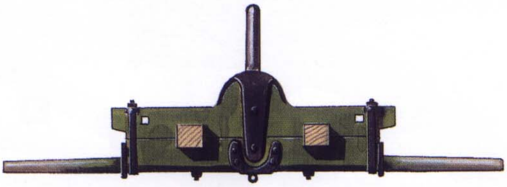

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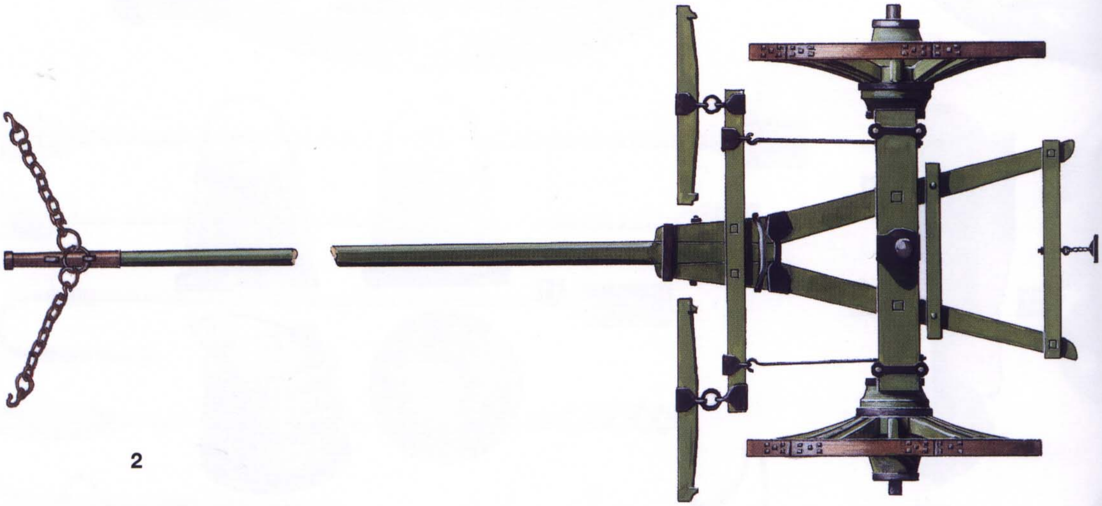

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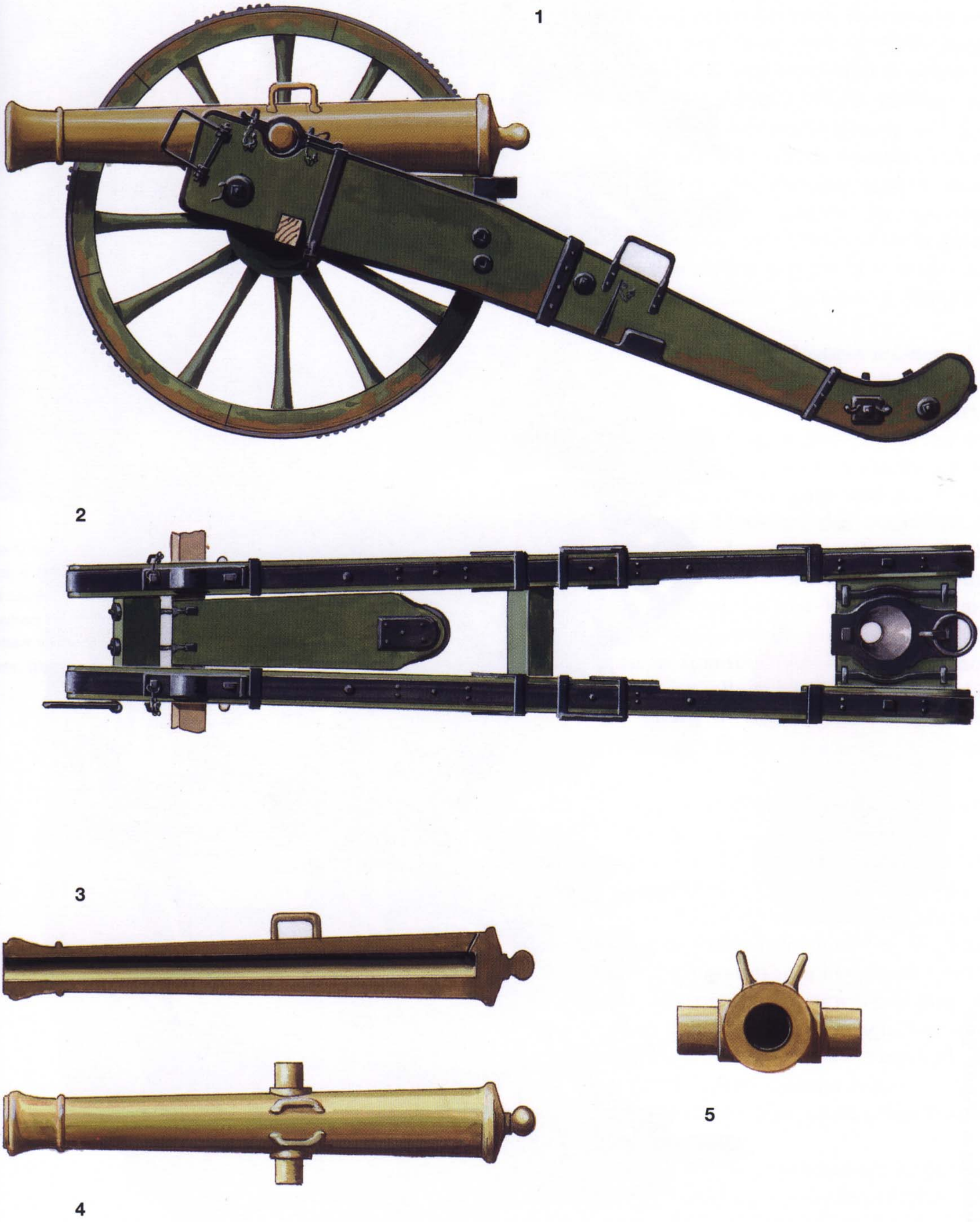
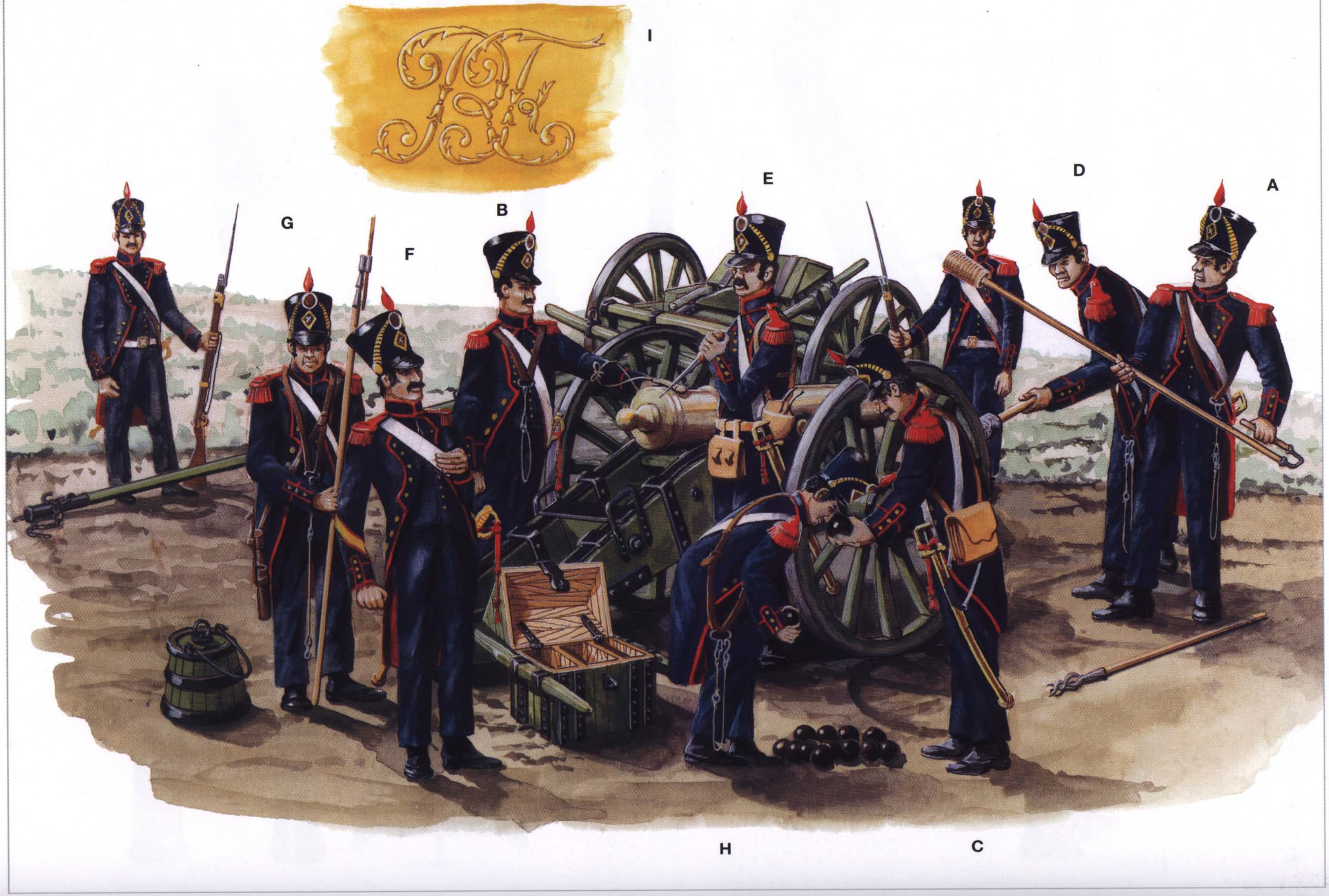
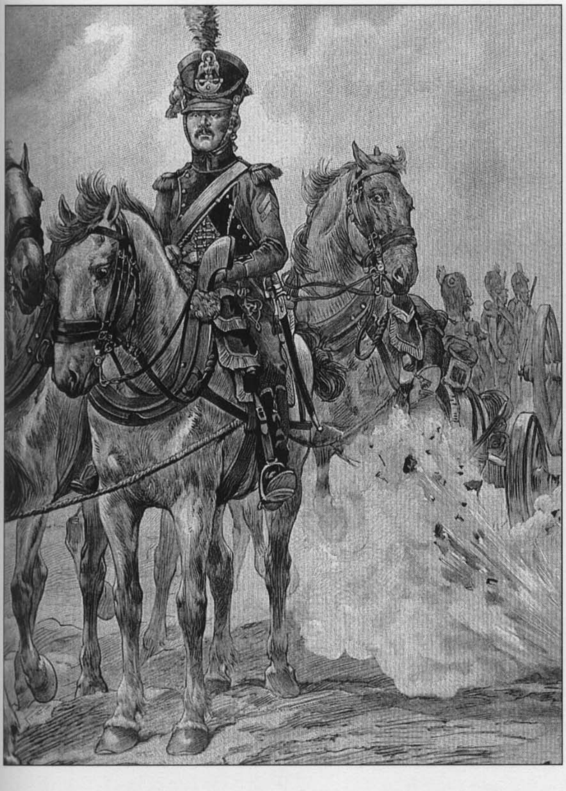
F: Year XI 6-pdr field gun and carriage, *c.* 1803–08



G: Serving a 4-pdr gun





Artillery train of the Imperial Guard, *c.* 1808–12. The gun (right background) has been unhooked from the limber and is in action while the train waits in its rear. (Print after JOB)

Napoleon for his part favoured the proposals, especially regarding the introduction of the 6-pdrs. He had noticed that generals with an infantry background did not really differentiate between 4- and 8-pdrs in the field. He also favoured the 5 inch 6 lines (or 7 lines – sources indicate both) howitzer because its ammunition weighed a third less than that of Gribeauval's 6-inch howitzer and it had an identical calibre to the 24-pdr guns. Its reduced weight (280kg) and longer barrel (115cm) corrected flaws revealed on campaign by Gribeauval's 6-inch howitzer, namely its lack of accuracy and the fact that it would frequently damage or shatter its carriage. Napoleon still favoured other areas of Gribeauval's system but felt that efforts to make it as simple and as light as possible while increasing firepower should continue.

As the First (or senior) Inspector-General of Artillery, General Marmont also pushed for the new Year XI system, but the opposition from Gassendi and others was fierce. Tests and experiments were also necessary to determine the exact lengths of the future guns and some were held in Strasbourg. However, this could not be done overnight and it took much work and many months to test and refine the proposed new system. In 1804, Marmont went on to other duties while Napoleon became emperor and the Year XI system became more of a gunners' debate. The 6-pdr was generally seen as a good idea and was the only Year XI gun cast in quantity (see Plate F for more details). However, its manufacture was cancelled in 1808 as the army had an ample supply of this calibre. Much of this abundance of 6-pdrs was due to the many captured Prussian and Austrian pieces that had been taken into the French artillery.

In January 1809, Napoleon was informed that the Year XI system really only consisted of the 6-pdr, the 3-pdr mountain gun and the 5 inch 6 lines howitzer. There were complaints about the new system too. The 6-pdr barrel was good enough but its poorly designed carriage caused problems. Some veteran soldiers felt that, on the whole, Gribeauval's 4- and 8-pdrs were better. Nor did the howitzer introduced by Marmont make all gunners happy. Some wished for something like those used by the Austrians and Russians. Indeed, apart from the new 6-pdr gun and the 5 inch 6 lines howitzer, it seemed that the Year XI system was not a really new system, merely a reorganisation of Gribeauval's. Even with this limited reform, the original Gribeauval system seemed better to many gunners. The tangible result of all this was a growing perception that the Year XI system had not lived up to its promise.

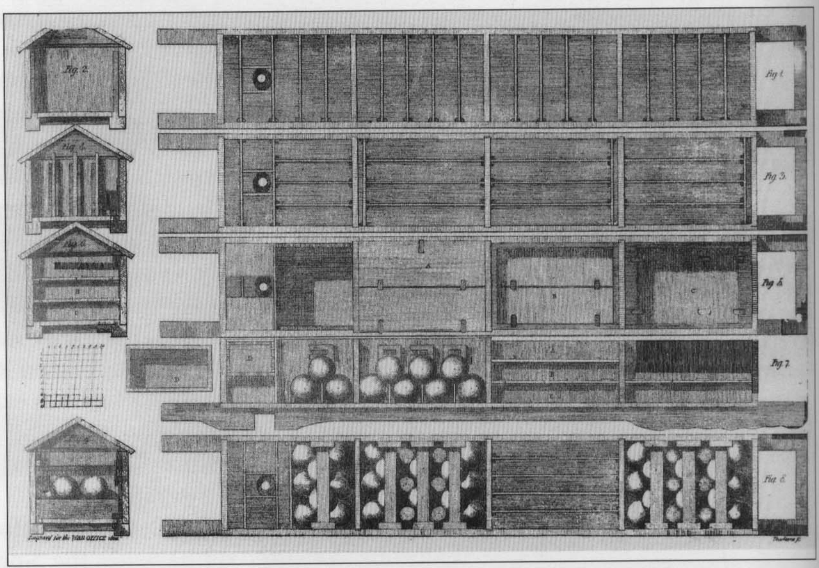
To sort this out, the emperor finally set up a commission in January 1810 to evaluate the system and recommend a solution. Headed by General Songis, the current First Inspector General of Artillery, the commission concluded that the Year XI system was largely unsuitable and that it was best to continue with Gribeauval's system while accommodating the 6-pdr field piece. The howitzer was retained but some copies of the Austrian and Russian 6- and 8-inch ones were later produced. Furthermore, as early as 1804, Gribeauval 6-inch howitzers were being cast at Douai and Strasbourg instead of the Year XI howitzer and more were cast as late as 1813 at Douai.

Year XI field carriages

Another, less noted aspect of the Year XI system was its attempt to 'correct' the Gribeauval field gun carriages. The end of the trail was made more rounded and turned slightly more upwards; the trail's top was straighter; another reinforcement band was added; and, in particular, the second slots to place the gun barrel trunnions in when travelling were omitted. From now on, the barrel would always be in the same trunnion slots. This would prevent the time-consuming manoeuvre to change slots when putting the gun into action (see Plate F for more details).

Whether these specifications were widely followed remains an open question. General Gassendi and other influential artillery officers opposed the Year XI changes to Gribeauval's system and this included modifications to its carriages and other rolling stock. Most changes were felt by critics to be cosmetic rather than real improvements and hindered mobility in the eyes of many a veteran gunner.

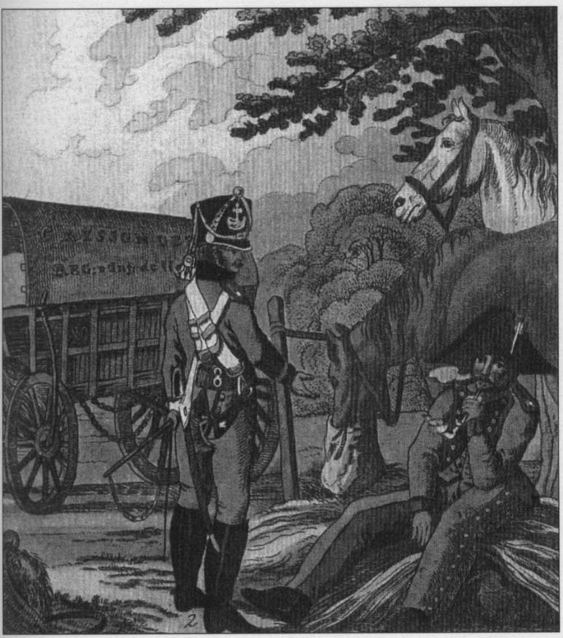
In any event, the construction plans were sent out so the carriages could be made for the new 6-pdr guns that were being cast from 1803. When submitted to rough campaign conditions, which became more common from late 1805 onwards, the new carriage design was found to have several weaknesses. In some cases, Year XI carriages fell apart under severe stress. This was hardly the sort of thing any gunner wanted to happen on campaign and, probably from 1808, dependable Gribeauval-style carriages adapted for 6-pdrs were made. From 1810, the Gribeauval system carriages were officially readopted.



Artillery caisson's interior distribution. At top: divisions for 12-pdr cartridges. Second from top: divisions for 8-pdr cartridges. Third from top: divisions for musket cartridges. Fourth from top: side view of divisions for howitzer shells and gun cartridges. Bottom: top view of divisions for howitzer shells and gun cartridges. (Print after de Scheel)

REGIMENTAL GUNS

In the mid-18th century, the idea of attaching small-calibre 'Swedish' and Rostaing guns to infantry regiments was popular and, from 1757, each regiment was assigned two field pieces. However, their effectiveness in battle was disappointing and this programme was cancelled after the

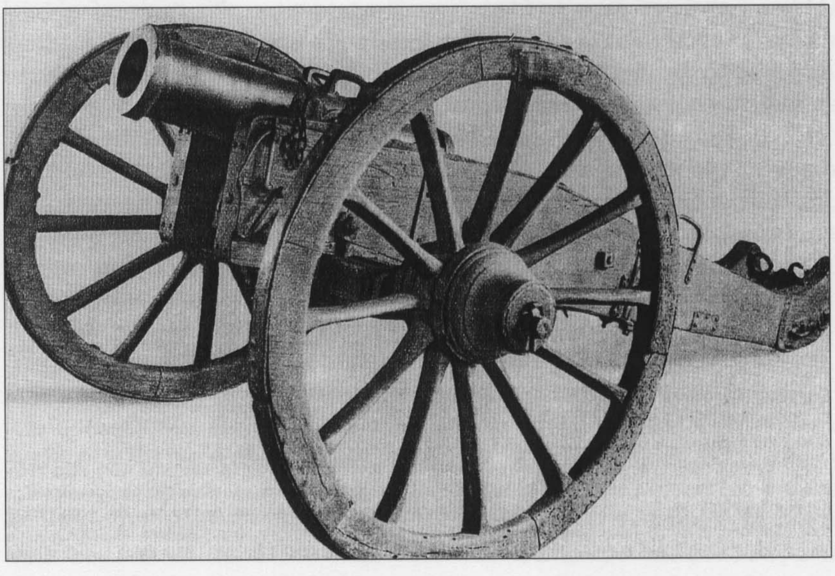


Men of the 8th Artillery Train Battalion dressed in sky blue faced with dark blue trimmed with non-regulation red piping, white metal buttons, shako plate and chin scales. The wagon in the background is light grey-blue and seems to have 'Caysson de ...' and 'Reg: Inf: de l ...' on it. It does not look like a caisson, however, and the somewhat confused artist in Prague seems to have put this on a support wagon. (Print after Berka and Zimner. Anne S.K. Brown Military Collection, Brown University, USA)

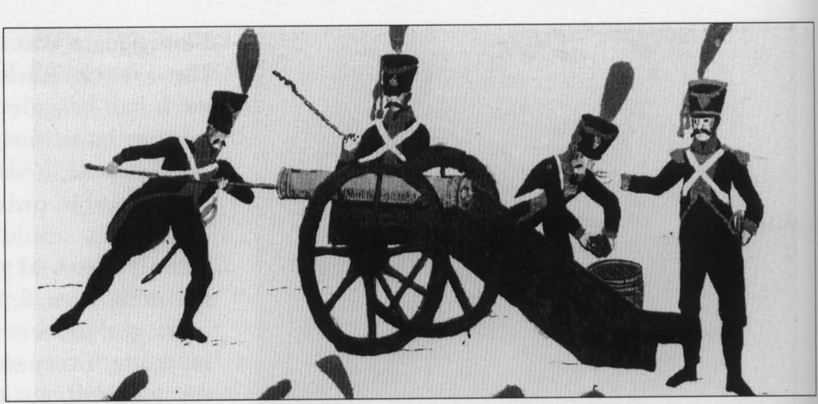
Seven Years War. The notion was revived during the French Revolution. On 21 February 1793, each half-brigade was to have six 4-pdr field guns, two per battalions, served by an artillery company. In the event, it was a wildly optimistic and clearly unachievable order as it meant that 198 artillery companies would need to be raised to deploy some 1,228 field guns. This would require 10,000 gunners, some 2,300 horses besides the guns with carriages, limbers and caissons, all of which had to be made. Every sort of light gun was pressed into service and local foundries cast some. This included old and new 3-pdrs as well as 4-pdrs. Some departments managed to organise and equip volunteer gunners but, on the whole, it proved an impossible scheme to implement. In January 1798, the idea of battalion guns was shelved.

That same year, General Napoleon Bonaparte led some 30,000 men in the rather romantic expedition across the Mediterranean into Egypt. The French landed in July, rapidly took Cairo and occupied part of the country. Napoleon's artillery included 13 4-pdrs and 29 3-pdrs (17 from Italy, probably captured from the Austrians). The peculiar tactical challenges of fighting in Egypt convinced Napoleon that light artillery was necessary to support infantry against the outstandingly brave Mamelukes. From 25 June 1799, each half-brigade was allotted a 3- or a 4-pdr served by 15 men. This arrangement ended with the end of the Egyptian campaign in 1801.

However, the concept was to be reborn. Following the occupation of Vienna in 1809, Napoleon revived the idea of regimental guns as he now had the capacity to implement it. Numerous Austrian 3- and 4-pdr guns with carriages and limbers had been found in the city's arsenals



Year XI system 5 inch 6 lines brass howitzer with its field carriage, *c.* 1809–13. Marked with an N between two palm branches and STRASBOURG LE 12 FRUCTIDOR AN. 13 indicating it was cast at Strasbourg in 1805. Note the carriage, which has the somewhat higher trail end of the Year XI system but is otherwise generally similar to a Gribeauval 6-inch howitzer carriage. This gun was captured by Portuguese troops at the battle of Vittoria (Spain) on 21 June 1813. It is preserved in the Museu do Ejercito in Lisbon. (Print after Ferreira Martin) and Napoleon decided to use them. By an order of 9 June 1809, line infantry regiments were each allotted two of these guns. In reality, not all regiments in the army were meant to have such guns but only those in Germany and Austria. In the event, regiments in the corps of marshals Davout, Masséna and Oudinot received these guns with 240 rounds for each.[10] They had to be served by a detachment formed from the regiment but nevertheless seem to have been a popular addition with the men. They were kept for troops on service in the east but withdrawn from regiments going back to France or Italy. Although there was some doubt about the effectiveness of these weapons, Napoleon thought them useful and, on 11 February 1811, decreed that each regiment should have an artillery detachment of 4 guns, 18 caissons, a forge and a detachment of 60 gunners. This particular order was for a Corps of Observation watching the Russians. On 17 April 1811, regiments in France were ordered to organise a detachment of artillery before marching east. In June 1812, Napoleon's line regiments marched into Russia and all the cumbersome regimental light artillery guns were lost in the disastrous winter retreat. In any event, Napoleon had seen for himself in battle the lack of firepower of such guns and, in 1813, cancelled the order.



A brass light-calibre regimental field gun, c. 1809–12. The carriage is painted in the standard olive-green. Although ordered to wear the standard artillery uniform, the regimental gun crews often had distinctive uniforms. In this case, the infantry's white lapels have been replaced by red ones, the shako has gained a tall red plume and red cords. Regimental artillery train drivers were to wear the train's grey-blue uniform. (Print after a naïve drawing of the period)

French regiments deployed elsewhere, notably in Portugal, Spain, Italy and the Balkans did not have regimental light artillery.

MOUNTAIN ARTILLERY

Military theoreticians tackled from time to time the topic of special designs for artillery to be used in mountainous country. Such artillery needed to be light and transportable through mountain passes. In practice there were relatively few campaigns in the mountains and designs remained experimental. With the wars of the French Revolution, some of the campaigns took place in the Pyrenees and the Alps. To solve the problem, French gunners tried the Gribeauval field guns and, to their delight, found the 4-pdr in particular quite suitable, especially during the 1799 campaign in Switzerland. By using the *prolonge*, Gassendi related, the 4-pdrs could cross ravines and ditches. The carriages, because their main components were fastened together by screws and bolts, could be taken apart for ease of transport and 'pass by the most inpractible roads' and be reassembled. The ammunition

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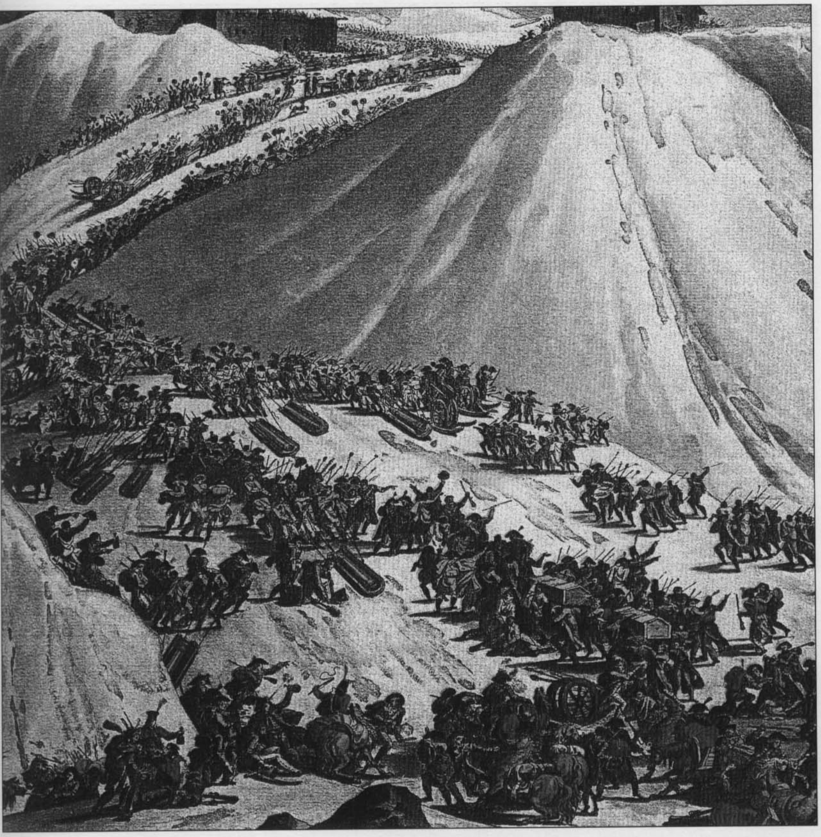
[10] The line infantry regiments were the 2nd, 3rd, 4th, 5th, 8th, 9th, 11th, 12th, 13th, 17th, 18th, 19th, 21st, 23rd, 24th, 25th, 27th, 29th, 30th, 33rd, 35th, 37th, 42nd, 46th, 48th, 52nd, 53rd, 56th, 57th, 60th, 61st, 62nd, 65th, 72nd, 79th, 81st, 84th, 85th, 92nd, 93rd, 94th, 95th, 102nd, 105th, 106th, 108th, 111th and 112th. The 4th battalions of the 39th, 40th and 88th line regiments. The light infantry regiments were the 3rd, 5th, 6th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 18th, 22nd, 23rd and 24th. For more details see Alain Pigeard, 'L'artillerie régimentaire sous l'Empire (1809-1813)' (*Tradition*, No. 154, Mars 2000).



Passage of the St. Bernard pass by the French Army, May 1800. Note the sleds for the 4- and 8-pdrs, and caissons pulled by gangs of men. (Print after Thévenin)

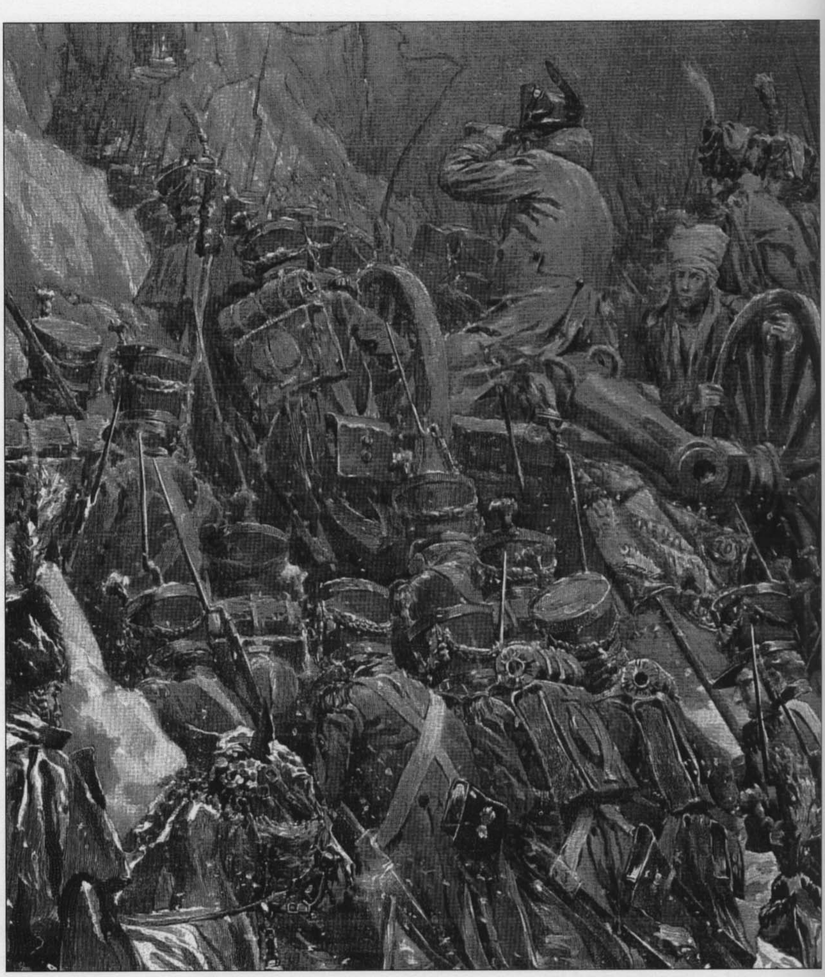
boxes and artillery tools could also be brought fairly easily and be ready 'to march against the enemy'.

The most spectacular mountain operation of the Napoleonic era was the passage of the Great St. Bernard pass in the Alps by the French Army in late May 1800. Napoleon wanted to turn the Austrians in Italy by using this pass, which was generally thought to be impassable by artillery because of snow and its icy and narrow paths. But First Consul Bonaparte was a gunner as well as a daring general and was well aware of what his artillery could cross. The 4-pdrs and even the 8-pdrs were brought to attempt the crossing, the 12-pdrs, however, were left behind. Some 500 mountaineers were hired to help in the operation; mules carried ammunition and tools; caissons, wheels and carriage parts were manhandled, a caisson by 20 men, its cover by 8, etc.; gun barrels were placed in pine logs hollowed out for the purpose acting as a sort of sleigh. General Marmont was in charge of the operation and, in his memoirs, described the hollowed guns sleds as carved to be flat on the bottom and rear, rounded in front. A sort of crooked rudder held by a gunner was placed in the gun's muzzle so as to guide the sled and prevent the barrel from rolling over. The guns and caissons all crossed the pass sliding on the snow and were reassembled at a village on the Italian side of the Alps. There was some damage because of this rough crossing but not enough to make the pieces unserviceable. The Austrians now had to cope with a powerful French Army in Italy.

A 3-pdr mountain gun was put forward in the 1803 Year XI system and, though a few were reportedly made, the number was minimal and, by 1810, the Gribeauval system was reinstated. In practice, the light Gribeauval 4-pdrs were the main 'mountain' gun of the era.

PAINT AND TRIM

Up to the 1760s, French army carriages, limbers and other rolling stock were painted in red with black ironwork. This was changed to a light blue-grey with black ironwork at the time of the introduction of the Gribeauval system. This again changed to an olive-green shade trimmed with black from the 1790s. The olive hue could vary but the recipe to make it was recorded in 1789 by General Gassendi as a mixture of yellow ochre and black. In the French artillery, this was generally made by adding half an ounce of black to five pounds of yellow ochre (or 2,500g of yellow ochre for 30g of black). The black colour was obtained from fine powdered black charcoal. Linseed oil was used for mixing and it gave a shiny effect to the paint.



Napoleon sitting on a brass Gribeauval 4-pdr as his troops reach the convent at the summit of the Guadarrama mountains during the invasion of Spain in late 1808. (Print after Eric Pape)

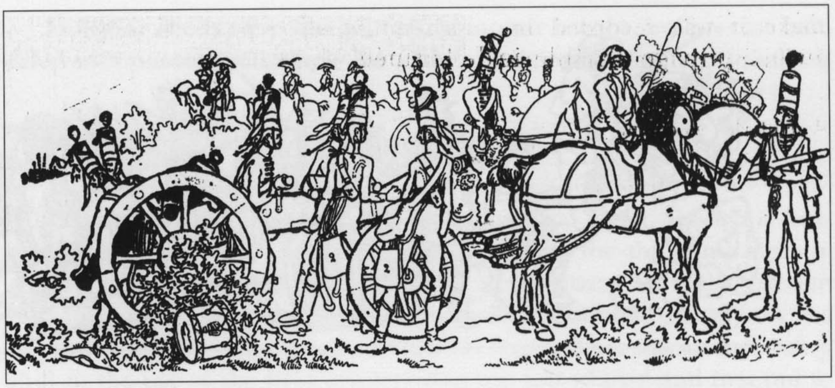
For painting wood a batch of 60lbs 8 ounces of olive paint required 36lbs of yellow ochre, 3lbs of fine charcoal black powder, 1lb 8 ounces of litharge (a protoxide of lead, its chemical reaction with oils helped the paint dry) and 20lbs of linseed oil. An *ouvrier* would require three days to prepare it and the finished batch would be enough to give 18 caissons a coat.

For ironwork a batch of black paint required 2lbs 8 ounces of fine charcoal black, 2lbs of linseed oil and 2 ounces of litharge. Three hours were required for its preparation.

Carriages, limbers, caissons and other wagons were all given two coats of paint. The first coat was to be 'very clear' and 7lbs and 8 ounces of thinner (turpentine) were added to the 14lbs of olive paint. The second coat required 12lbs of olive paint to which was added 2lbs 8 ounces of the thicker cooked oil (*huile cuite*), 1lb 4 ounces of linseed oil and 4 lbs 8 ounces of thinner. For ironwork, the first coat was a mixture of 1lb 8 ounces of black paint, 1lb of olive paint and 1lb of thinner. The second coat was a mixture of 4 ounces of very fine black charcoal, 1lb 14 ounces of cooked oil and lb 4 ounces of thinner, which produced a deep black hue.

While olive-green was the standard, period artworks occasionally show variations. A few carriages can sometimes be seen in light blue-grey or in varnish. For instance, an 1809 Berka print published in Prague shows a wagon of the 8th Artillery Train Battalion painted in a light grey-blue hue. In some cases, prints, notably those sold by the widow Chéreau in Paris from 1800 to1805, show bi-coloured carriages and caissons. A gun carriage and its limber has the wheels and ammunition box cover in green but the cheeks painted in a rusty red in one case and both carriage

A 4-pdr field gun being set up by horse artillerymen in the 1790s. The two gunners in front have just moved the gun from its travelling to its action slots on the carriage. Other gunners are unhooking the trail of the gun from the limber. (Print after Dorel)

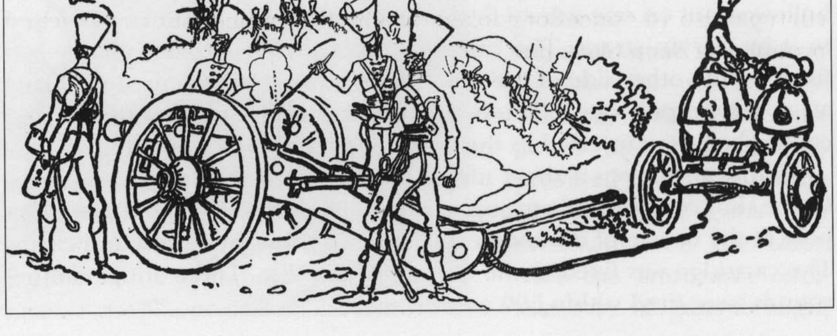


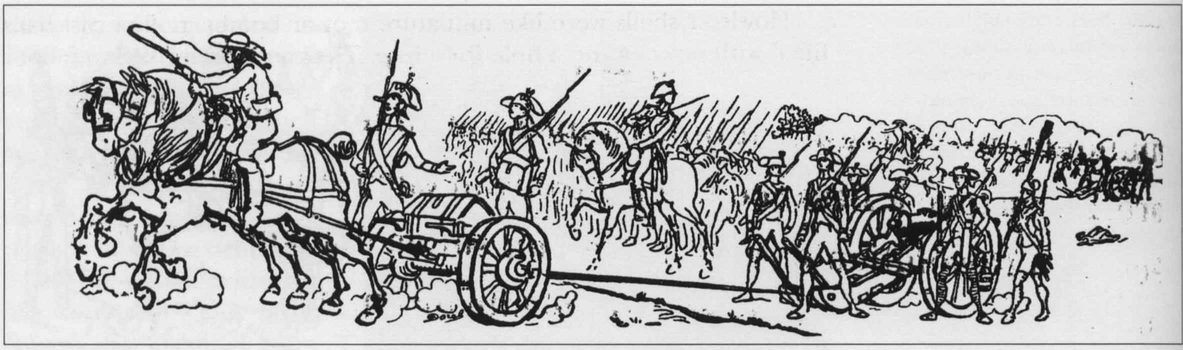
and wheels completely rusty red in another. A caisson is shown painted in rusty red but its cover and front wheels in green. In an 1806 painting of the surrender of Ulm (17 October 1805), a carriage is seen in a yellow ochre and black zebra paint job. These variations may have been caused by the use of older stocks of paint still available or recently captured in enemy stores.

SETTING UP THE GUNS

Choosing the exact site where guns would be set up was the responsibility of the battery commander. The position required ample room to manoeuvre and an easy way out should a hasty retreat become necessary. Once he had seen the terrain, he identified the exact spot where each gun should be. The guns were then called forward. Depending on the condition of the ground and the intensity of enemy fire, they would walk, trot or gallop. If they were under fire, the guns would move and set up as quickly as possible so as to return fire. When a unit arrived with its guns at the chosen site, it wheeled around and stopped. The guns were not usually set up in a line as is often believed (and shown in artwork), as such a perfect formation made too good a target and the position might be enfiladed by the enemy's guns. Instead, they would be set up as an uneven line with about 6 metres between each gun, although this could vary greatly. If an 8- or a 12-pdr, the gun was moved forward on the carriage from its travelling trunnion slots to its action slots, an operation which could be difficult for the men performing it on account of the

A 4-pdr field gun served by horse artillerymen in battle, c. 1807. Note the *prolonge* connecting the limber to the carriage's trail. (Print after Dorel)





Field gun being pulled back to a new position by the *prolonge* tied to the limber, 1790s. (Print after Dorel)

gun's weight. The gunners would then unhitch the trail of the gun carriage from the limber. The limber was pulled back about 20 paces from the rear trail of the gun's carriage. The *prolonge* remained fastened to the carriage at one end and the limber at the other. Using their *bricoles* and levers, the gunners would place the gun at the exact spot it was required. The ammunition box was taken from the carriage and placed on the limber's front and the lid taken off.

As a rule, it took eight artillerymen to serve all field guns from 4- to 12-pdrs. They had the help of infantrymen, five for 8-pdrs and seven for 12-pdrs, to manoeuvre them. It took 13 artillerymen to operate a 6-inch howitzer, including two bombardiers to set the fuses if shells were fired. The procedure of firing a gun in action was basically the same for all field artillery. Plate H gives the sequence of loading and firing a 4-pdr. Higher calibres required more men but the sequence was basically the same. The eight artillerymen performed the generally identical gunner's drill with the infantrymen providing extra muscle power to move the guns and the ammunition. During a battle, the guns might be ordered to change places. If moving forward, this was usually done by using the *bricole* drag ropes and handspikes; if retreating, by making the train drivers advance their horses slowly so that the weight would be taken by the *prolonge*.

AMMUNITION

The French field artillery predominantly used solid iron round shot (or cannonballs), antipersonnel canister and grape shot, and howitzer shells. Black powder was put in a cartridge that was a bag (ideally of flannel) whose exterior diameter was of the shot's calibre.

Solid shot was most commonly used and most effective at long range. From Gribeauval's era, it was often fixed to a sabot; a wooden disc hollowed out on one side to fit the base of the cannonball and fastened to it by two tin straps. The cartridge bag with the powder charge was fixed on the other side of the sabot. This 'strap shot' was used for firing at a very rapid rate. Otherwise, the cartridge bag, wadding and cannonball were inserted in the bore separately and rammed in.

Canister shot was a sheet metal cylinder filled with small lead balls. Grape shot consisted of a group of iron balls clustered around a wooden pole at the centre of a wooden disk held together by canvas and cords. The cartridge was fixed to the bottom of the disc. These antipersonnel rounds were fired within 500 metres.

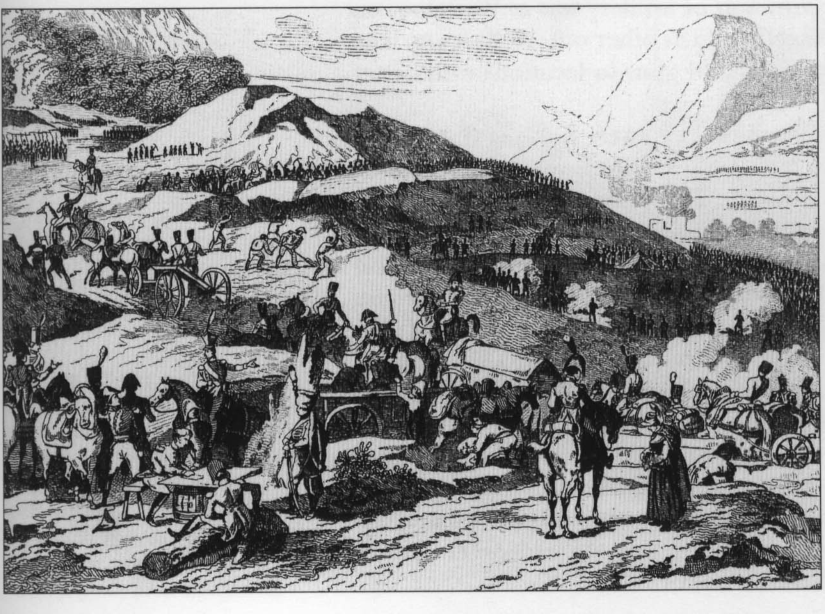
Howitzer shells were like miniature mortar bombs, hollow-cast balls filled with powder and a hole for a fuse. They were then fixed to sabots.

IMPERIAL CAMPAIGNS

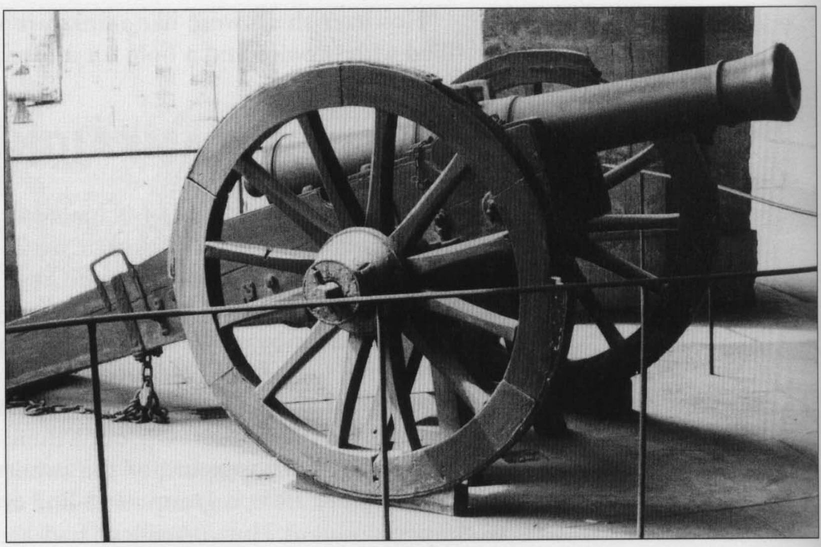
During the later part of Napoleon's imperial reign, the main field gun became the Year XI system 6-pdr, at least for the campaigns in central and eastern Europe. Some Year XI howitzers were also present but, for nearly everything else, the gunners continued to rely on the dependable Gribeauval system. In tactical terms, there was an increasing shift in the use of the field artillery that was introduced and first put to the test on a grand scale by Napoleon. Batteries were grouped to provide for increased firepower. Up until then, field artillery had always been seen as a support weapon for the cavalry and infantry. At Austerlitz, on 18 December 1805, a group of 18 line artillery guns along with 24 of the Imperial Guard Horse Artillery had a decisive effect on the Russian's defeat at the Santon Heights sector of the battlefield. The guns at the heights had been rushed there to cover a gap between the corps of Marshals Lannes and Soult. They prevailed over the enemy infantry's attack. This was not missed by Napoleon. Line artillery batteries tried it again with 25 guns under Marshal Lannes at Jena, on 14 October 1806. The tactic met with renewed success against the Prussians and Napoleon did not even have to commit the guard artillery. At Eylau, on 8 February 1807, the Russians and Prussians had about 400 guns and the French only 200, but General Senarmont brought the massed French guns closer to the enemy, which had a devastating effect. At Freidland, on 14 June 1807, the gathered artillery from the three divisions of Marshal Victor's corps, some 38 guns, again pounded the Russians and turned the tide for the French.

Definitely, gathering the guns for massed artillery barrages was now perceived by Napoleon to be a decisive factor that could change the course of a battle. The Russians too had toyed with the idea. However, corps commanders, French or otherwise, were jealous of their guns and were unwilling to let them pass under the command of other generals. Napoleon found the solution to this problem by using the Imperial Guard's artillery as a powerful reserve. At Wagram, on 6 July 1809, the guard and line artillery provided a concentration of some 102 guns that eventually won the battle over the Austrians. Such numbers of guns brought

Field artillery setting up before a battle, *c.* 1805. Note the many men handling picks and shovels building the field fortifications for the batteries. (Print after Martinet)



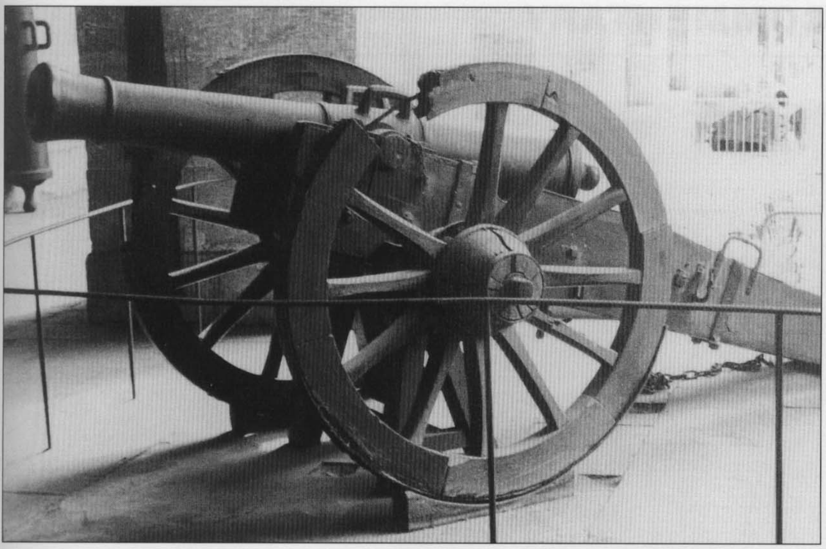
new problems in coordination and command.



Gribeauval 12-pdr brass field gun with its carriage, *c.* 1800–15. View of right side. (In the courtyard of the Invalides, Paris, photo by René Chartrand)

In 1812, the Grande Armée marched into Russia with some 30 4-pdrs and 260 6-pdrs. No 8-pdrs were brought in that campaign. By then, the Russians had adopted massed artillery too and at Borodino both sides cannonaded each other relentlessly. Some 400 guns fired over 100,000 shots during the battle, but with no clear advantage to either army. Napoleon's Russian campaign ended in the disastrous retreat where so many men were lost to 'General Winter', as the Russians called their cold season ally. The loss of guns was enormous and, when what was left of the army regrouped in Germany during the spring of 1813, hardly any guns remained. Whatever was in reserve or that could be pressed into service was rushed from France to Germany where Napoleon faced a new pan-European coalition. At Lützen, 2 May 1813, some 60 guns of the guard's artillery stopped a Prussian attack in its tracks. Massed artillery was again used by the French at Bautzen, 20–21 May, and Dresden, 26–27 August, but the advantage given by the artillery was not exploited by the infantry at either battle. Some 600 field guns were with Napoleon's army at Leipzig, 16–19 October, but the emperor wanted 1,300. With reason as the allied army facing him had 900 guns. At one point of the three-day battle, the guard artillery wiped out the Bavarian cavalry with 50 guns but the battle was ultimately lost and Napoleon had to withdraw due to a shortage of ammunition. Some 150,000 rounds were fired during that battle. The last great concentration of artillery was at Waterloo, on 18 June 1815, with both sides cancelling each other out. Wellington, true to his habit, had positioned his troops and guns in locations with better cover than the French.

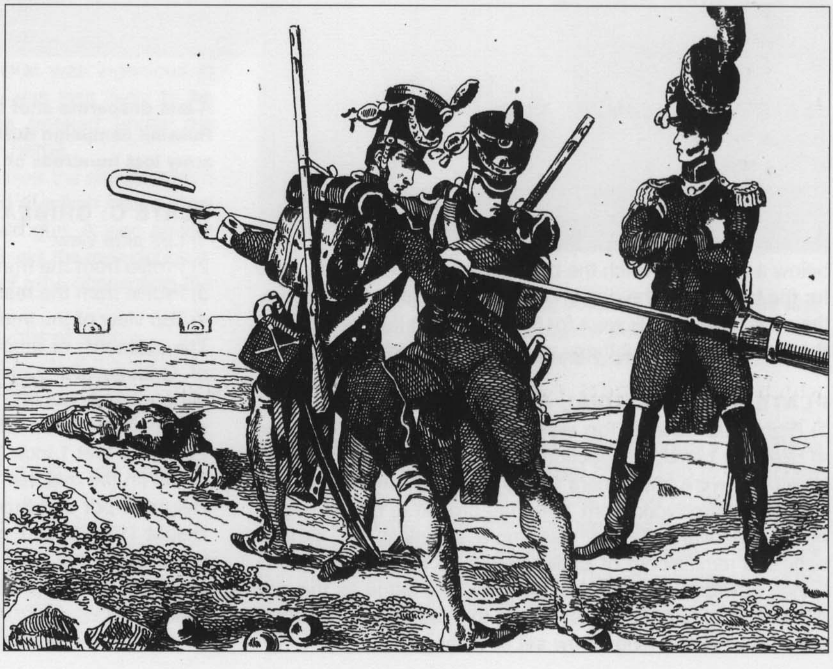
In the Iberian Peninsula, where the French were fighting the British, Portuguese and Spanish from 1808, the Gribeauval 4- and 8-pdrs remained the French Army's standard field guns. This may have been because the Spanish artillery *matériel* and ammunition, some of which was captured by the French, was also of the Gribeauval pattern. A typical artillery unit was the 2nd Company of the 2nd Horse Artillery Regiment, which had two 4-pdrs, two 8-pdrs and two 6-inch howitzers in 1809. The French in Spain and Portugal thus had very few Year XI 6-pdrs. In tactical terms, the French used massed artillery with great success against the Spanish in several large engagements. At Tudela, on 28 November 1808, the French massed some 60 guns, which annihilated the Spanish. This was repeated at the battle of Ocaña, on 17 November 1809, where Spain's main army was disastrously crushed. In general, the overwhelmed and usually outnumbered Spanish regular artillery could not counter with effective artillery tactics.



Gribeauval 12-pdr brass field gun with its carriage, c. 1800–15. The wheel has been damaged. (In the courtyard of the Invalides, Paris, photo by René Chartrand)

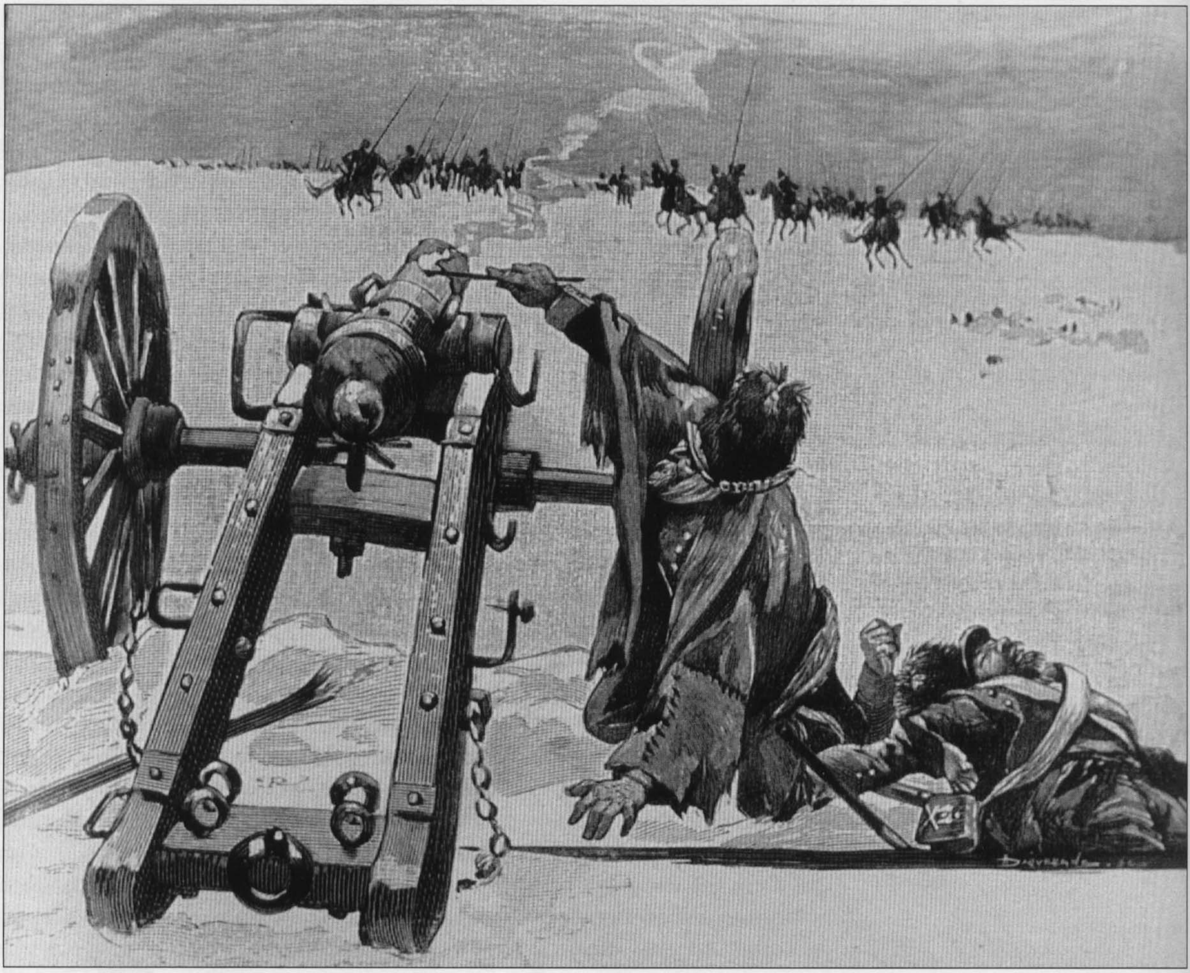
When the French came up against the Anglo-Portuguese it was a different contest. Initially, from 1808 in Portugal, the French did not have great numbers of field guns and neither did their opponents. It must be noted that Portugal's rugged geography hardly favours vast artillery trains. However, the Portuguese regular artillery was rapidly reorganised and reequipped as field artillery during 1809 and was soon as efficient as the excellent British artillery with whom it served side by side. Marching into Spain from 1811, Wellington proved a match for any French marshal by choosing ground that was always more favourable for his own artillery. The French guns and gunners fought hard against the British and Portuguese but their commanders, often feuding amongst each other, never caught up to Wellington's tactical edge. By 1813, the French were in retreat and many of their field guns were lost at Vittoria on 21 June 1813.

It is important to note here that, on the Continent, British artillery systems were practically unknown until the French encountered them during the Peninsular War. They were impressed with what they found and, in time, the British system used by Wellington's army would inspire the post-Gribeauval French artillery.



Two line artillery gunners sponging a light-calibre gun with a crooked handled sponge, c. 1807–12. The crooked handled sponge was an instrument introduced by Gribeauval to service light guns. An Imperial Guard foot artillery officer is nearby. (Print after Lacandrie)

COLOUR PLATE COMMENTARY



A last desperate shot towards Cossacks in the disastrous Russian campaign during the winter of 1812/13. Napoleon's army lost hundreds of guns in the retreat. (Print after JOB)

PLATE A: GRIBEAUVAL 12-PDR FIELD GUN

1) Right side view.
2) Top view.

This was the typical appearance of the Gribeauval field guns. The 12-pdr shown was the largest, the 8- and 4-pdrs were smaller but had the same features. The elevating screw was below a board on which the barrel rested. Note the two slots for the trunnions. The gun shown is in the battle action slots, the ones further back were for travelling. The 8-pdrs also had the travelling slots but these were not needed for the 4-pdrs.

PLATE B: GRIBEAUVAL 6-INCH HOWITZER

1) Right side view. 2) Top view. 3) Howitzer barrel top view. 4) Howitzer barrel side section view.

Howitzers were latecomers to the French Army. The 8-inch howitzers introduced from 1748 had proven to be too heavy, but Gribeauval's design was more practical. Its general outline is reminiscent of British howitzers of the period. The 6-inch howitzer carriage was generally the same as the gun carriage, the main differences were the absence of travelling slots and the elevating screw set at an angle.

PLATE C: GRIBEAUVAL CAISSON

1) Left side view.
2) Profile from the front.
3) Profile from the rear.
4) Top view of the interior arrangement of a 4-pdr caisson.

The caissons, or ammunition wagons, were an integral part of Gribeauval's system and were first designed in 1754 although only put into service from the mid-1760s. The measurements were as follows:

Length: 9 feet 1 inch (295cm)
Width (in the middle): 1 foot 8 inches (541.4mm)
Height (4-pdr and 8-pdr caissons): 1 foot 6 lines (338mm).
Height (12-pdr and musket cartridges caissons): 1 foot 2 inches (379mm)
Height (6-inch howitzer caissons): 1 foot 2 inches 6 lines (392.5mm)
Height of the rear (or great) wheels: 4 feet 10 inches (157cm)

Height of the front wheels: 4 feet 10 inches (157cm)
Iron axletrees: 5 feet 11 inches 6 lines (193.5cm)

PLATE D: GRIBEAUVAL 8-PDR AND LIMBER WITH AMMUNITION BOX AND INSTRUMENTS

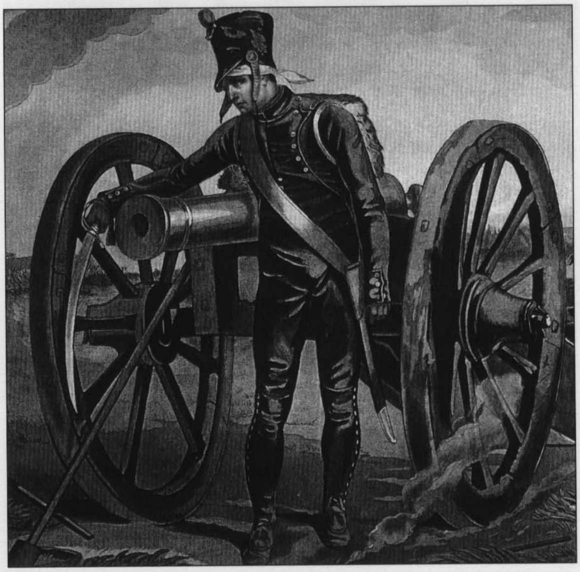
1) 8-pdr Gribeauval gun placed in the carriage's travelling slots.
2) Gribeauval system ammunition box fitted on the trail of the carriage between the cheeks when travelling. When the gun went into action, the box was taken from the trail and put on the limber further back.
3) Top, front and side view of ammunition box. The measurements of the boxes were, by calibre:

	LENGTH	WIDTH	HEIGHT (BOX):	HEIGHT (LID OR COVER):
12-pdr ammunition box	1 foot 4 inches (433.1mm)	1 foot 2 inches 8 lines (397mm)	1 foot 1 inch 6 lines (365.4mm)	4 inches (108.2mm)
8-pdr ammunition box	1 foot 10 inches 6 lines (607.2mm)	1 foot 6 lines (338.4mm)	1 inches (297.7mm) 4 inches	4 inches (108.2mm)
4-pdr ammunition box	1 foot 10 inches (594.5mm)	10 inches (270.7mm)	10 inches (270.7mm)	3 inches (81.2mm)

The main gunner's implements were:
4) Sponge and rammer combination tool (for a 12-pdr shown) used from 1801. Previously the rammer and the sponge were two separate tools.
5) Sponge and rammer combination tool (for an 8-pdr shown) used from 1801.
6) The crooked handle sponge (for a 4-pdr shown).
7) Worm and ladle combination tool used from 1801. Previously the worm and the ladle were two separate tools.
8) Linstocks, one having an intertwined slow match.
9) Priming wires.
10) Portfire stick. The stick is made of two pieces of sheet iron that hold the portfire, a thin cylindrical piece of paper filled with combustible ingredients that burn slowly.
11) The Gribeauval system water bucket was ingenious in that it was narrower at the top so it was less likely to be tipped over. When travelling, it was hooked under the carriage. Its shape also retained water better.
12) The *bricole* was a leather belt slung over the shoulder from which hung a length of rope at the end of which was a steel hook. Used by gunners to pull their field gun. A long *bricole* was the rope's full length, a short *bricole* was the rope doubled.
13) The *prolonge* was the long length of rope connecting the limber to the rear of the gun's carriage.
Field artillery fired the following main types of shot:
14) Canister.
15) Solid round shot, the usual cannonball.
16) Shell (howitzers only).
17) Grape shot.
18) Side cutaway view of a sabot. This item was used for cannonball and shell cartridges.

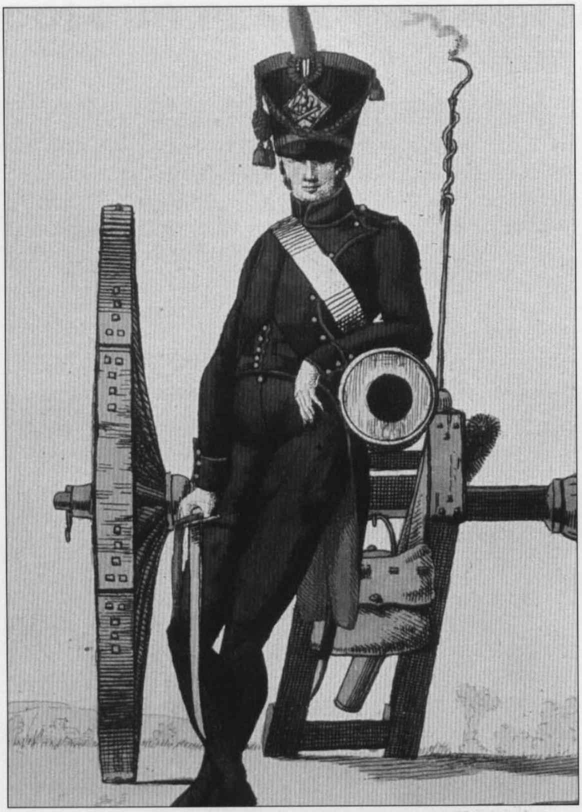
PLATE E: GRIBEAUVAL LIMBER

1) Side view.
2) Top view.
3) Vertical section through the axletree.



Gunner in front of his field gun, possibly a 4-pdr, in the last campaign of 1814. Print after Aubry. (Anne S.K. Brown Military Collection, Brown University, photo by René Chartrand)

In the Gribeauval system the limber was important in battle as well as when travelling. It was kept hitched up to the horses by the artillery train drivers and it remained connected to its gun by a lengthy rope, the *prolonge*, tied to the rear of the carriage's trail. This was especially useful when moving the gun backwards to a new position. The other battle use of the limber was that it carried the ammunition box from the carriage's cheeks in battle.



ABOVE **French field artillery gunner leaning on his gun, *c.* 1807. Note the steel tyres covering the wheels. (Print after Martinet)**

PLATE F: YEAR XI 6-PDR FIELD GUN AND CARRIAGE, *C.* 1803–08

1) Left side view. 2) Top view of carriage. 3) 6-pdr gun barrel section side view. 4) 6-pdr gun barrel top view. 5) 6-pdr gun barrel front view.

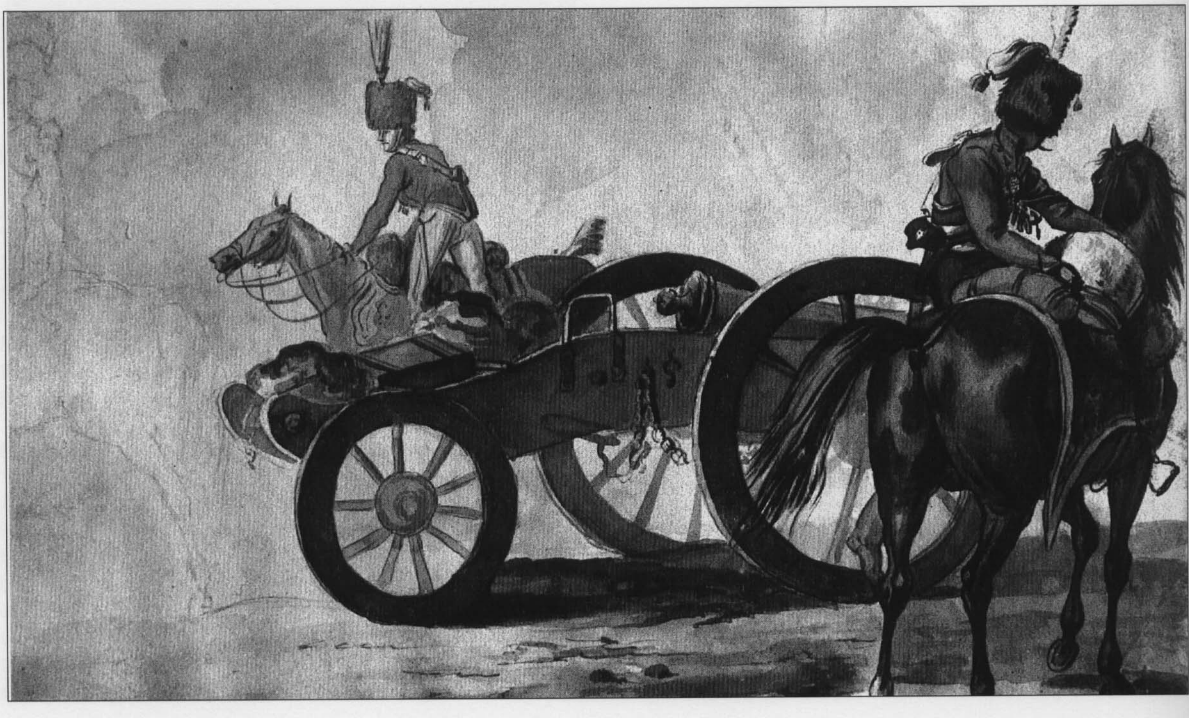
The barrels of the Year XI guns were to be even plainer than Gribeauval guns and did not even have reinforce mould rings except before the muzzle. The 6-pdrs cast between 1803 and 1808 would have been of this design and proved to be dependable guns. The bore of the barrel was 95.8mm, weight 390kg and length 1.80m.

The Year XI carriages were meant to improve on Gribeauval's and the great majority made were for 6-pdrs. However, these 'new and improved' carriages proved to be worse than the old ones. When submitted to rigorous conditions in the field on campaign, some of these carriages could not take it and disintegrated. A peculiar 'improvement' was the ammunition box, which was made bigger at 86cm long, 44cm wide and 46cm high (a comparable Gribeauval box was 49cm by 36cm by 35cm). It therefore did not fit between the cheeks of the carriage's trail but remained on the limber.

PLATE G: SERVING A 4-PDR GUN

Up to the introduction of the Year XI system 6-pdrs guns from 1803, foot artillery batteries each had six 4- and 8-pdrs with a couple of 24-pdr siege guns or some siege howitzers and mortars. While gradually replaced elsewhere in Europe with 6-pdrs, the French batteries fighting in Portugal and Spain continued to use the Gribeauval 4- and 8-pdrs for field guns. The plate shows a foot artillery detachment of 1808–11 in the

BELOW **Rear view of a Gribeauval field piece, 1821. Sketch by Vernet. (Anne S.K. Brown Military Collection, Brown University, photo by René Chartrand)**



Peninsula serving a 4-pdr field piece. Some of the detachment might also have been infantrymen detached to help the gunners, notably the men guarding the limber and some of the men moving the piece. This gun has just been fired.

A – Second gunner wearing a long *bricole*. This man's duty is to clean the bore. With a worm he takes out the remnants of the charge, then inserts the crooked handle sponge, takes it out and inserts it again, swabbing the bore in a turning movement.

B – First gunner wearing a short *bricole*. While the second gunner swabs the bore, the first gunner puts his index finger (or his thumb), protected by a leather cover, a 'thumbstall', on the top of the vent. This is to prevent small embers that might remain in the bore from heating up. Once the swabbing is done, the first gunner adjusts the elevation screw according to the instructions of the gun crew's first gunner, 'F'.

C – Second gunner wearing a short *bricole* and a buff leather pouch containing charges. He carries the cannonballs and charges to the gunner at 'D'.

D – Second gunner wearing a long *bricole*. He puts the powder charge (in a flannel or serge cartridge) and the cannonball in the bore and finally the 'cork' made of straw. He then uses the rammer to pack it in snugly.

E – Second gunner wearing a short *bricole*. Equipped with a buff leather pouch carried on a waist belt, he drives the priming pick through the vent and punctures the powder bag inside the barrel's bore, then inserts a priming match, called a Cravat, made up of two intertwined inflammable cotton cords inserted in a reed. Some gunners on this duty also wear a small buff leather bag to insert the reed and cotton priming matches.

F – First gunner, an NCO in charge of the gun. After having given his orders to place the gun, he aims it then goes to the right to give the order to fire.

G – Second gunner wearing a long *bricole*. He is to fire the gun. To do so, he is equipped with a long leather tube-shaped container with a sliding cover to keep the linstock, which he holds with his hand. Instead, he may also use a portfire stock. At the First gunner's command, he lights the match in the vent and the gun fires. This second gunner also has the task of cooling the barrel with water from a bucket, which must always be filled and close at hand.

H – Second gunner wearing a long *bricole*. He is to help the second gunner 'C' fill his bag, making sure it is always full and closed when the gun is fired. Further back, two second gunners armed with muskets guard the limber and caissons and keep the cooling water bucket full. They also help to move the gun.

I – The monogram 'RF' (République Française) was engraved on brass gun barrels from 1793 following the abolition of the monarchy, often after removal of the royal cipher. Previously, the double L royal cipher in scroll was usually engraved. In 1792, some guns were also marked with 'AN' (Arsenal National). From 1804, an 'N' between two palm branches was used as cipher.

Pontoon troops assembling a pontoon bridge to Lobeau Island. Napoleon (left) discusses with engineer officers details of the important crossing that his army, and artillery, must make during the Austrian campaign of 1809. Although French pontoon troops were part of the artillery's establishment during the Napoleonic Wars, they came under the command of engineer officers. (Print after F. de Myrbach)